

FIG. 1A

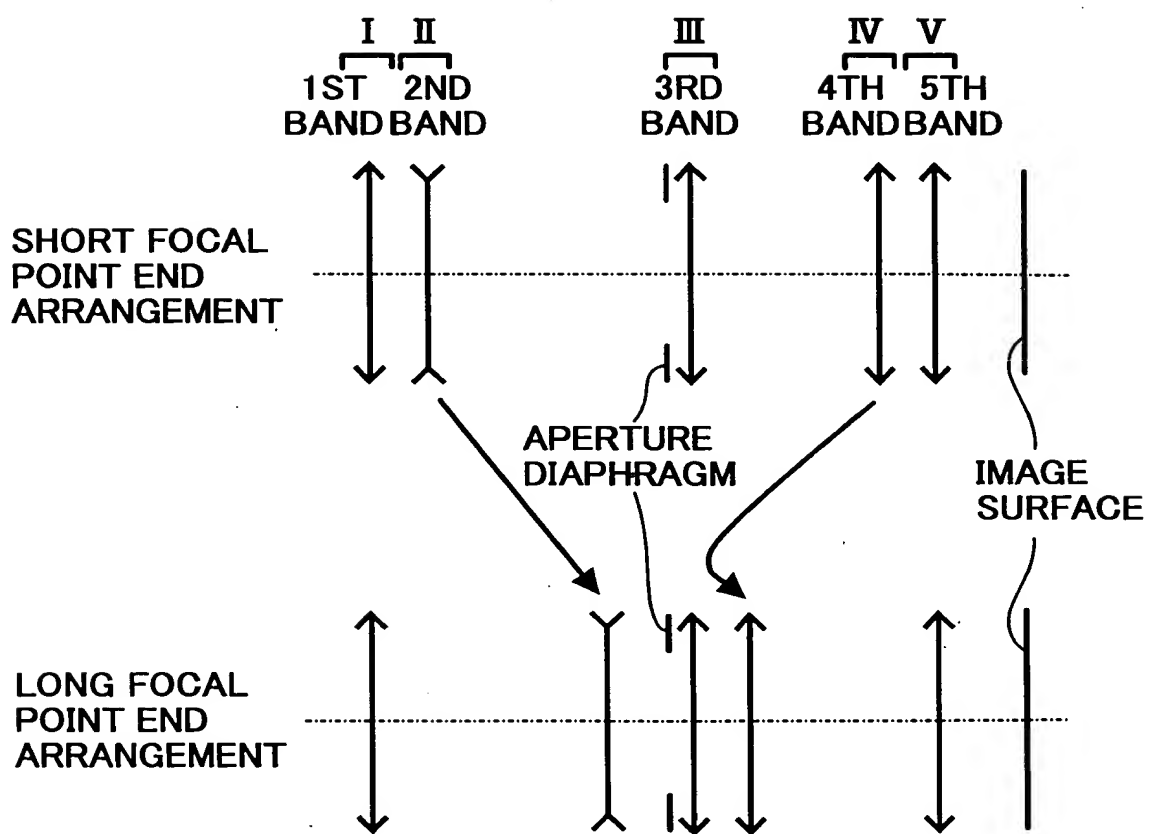


FIG. 1B

FIG. 1B

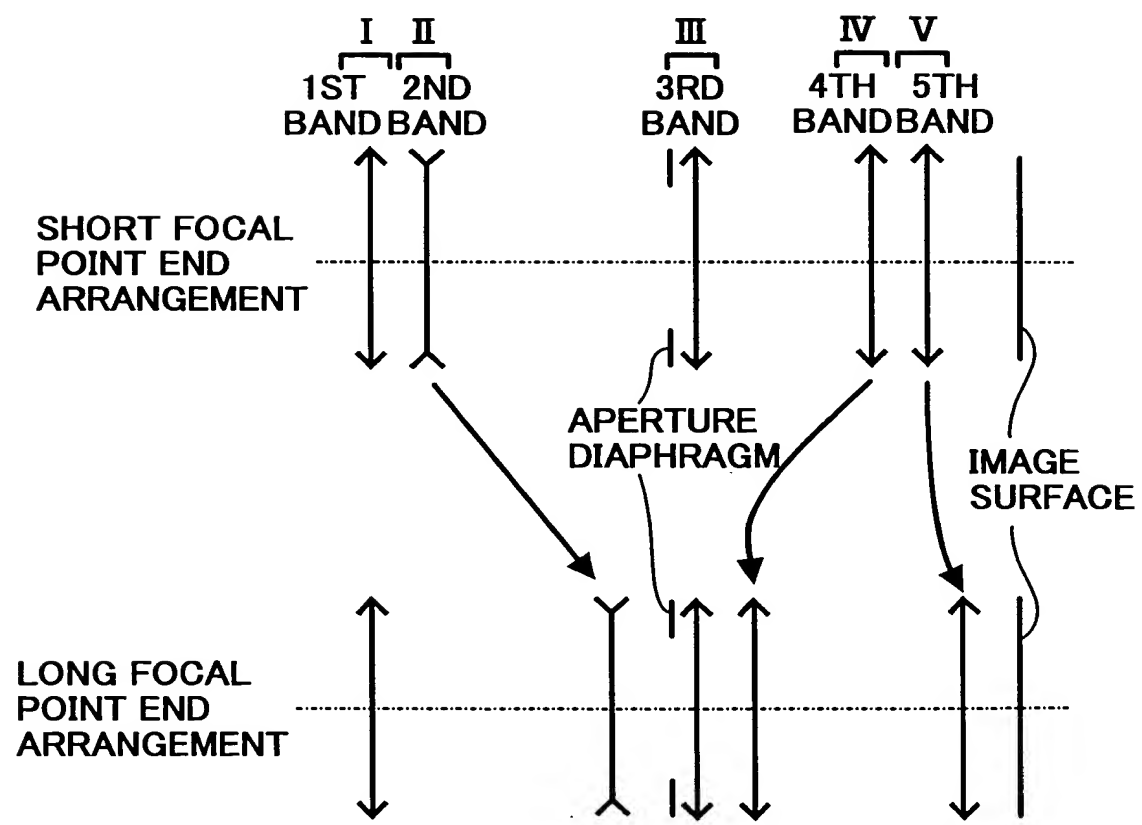


FIG. 2

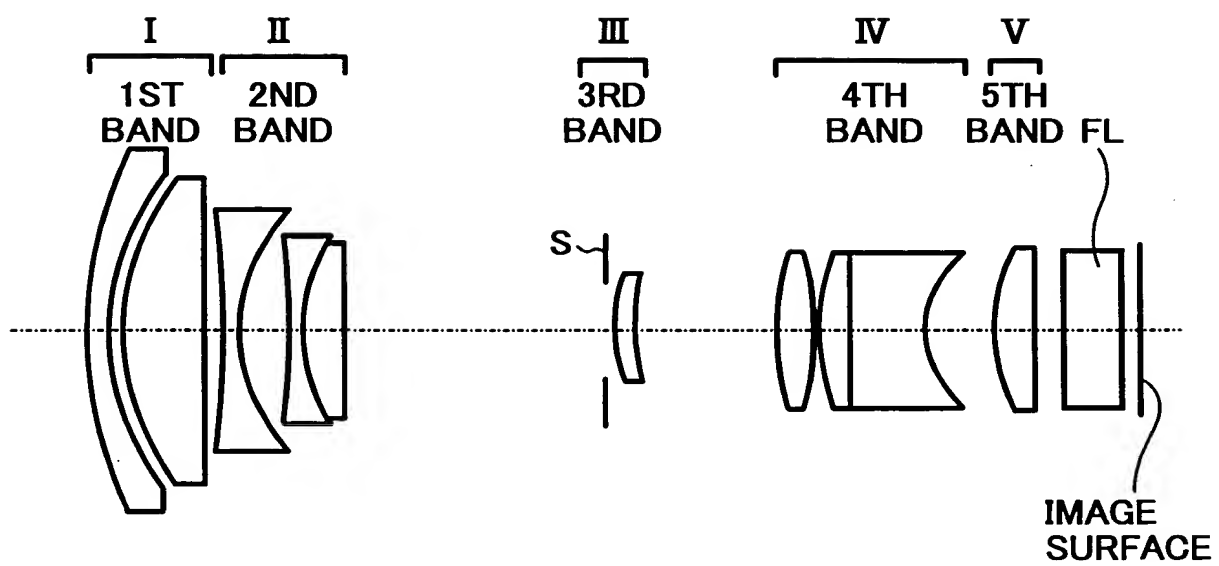


FIG. 3

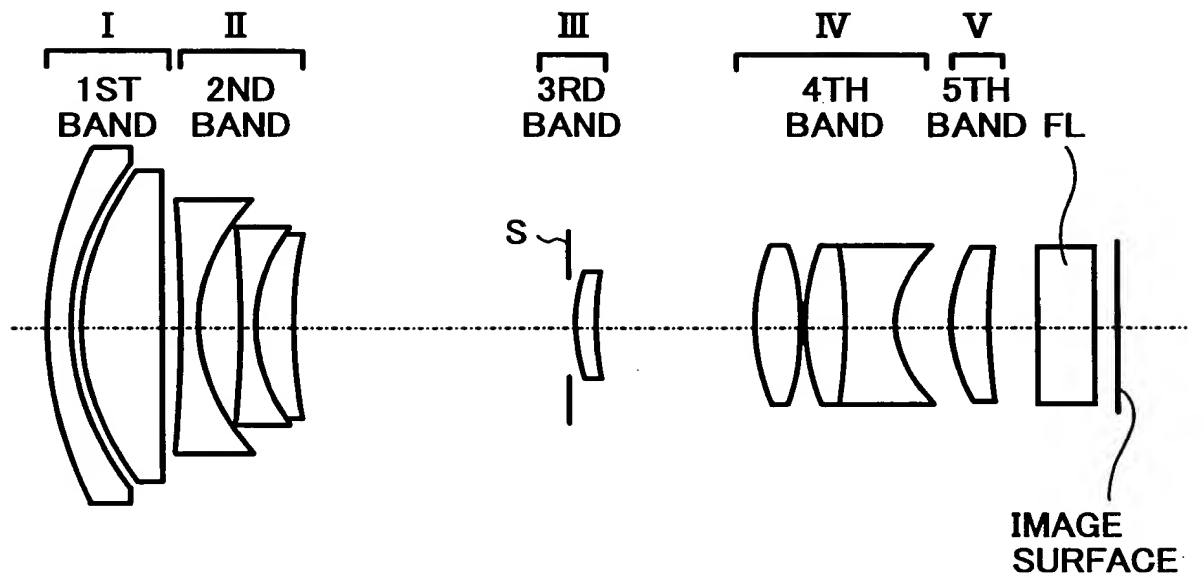


FIG. 4

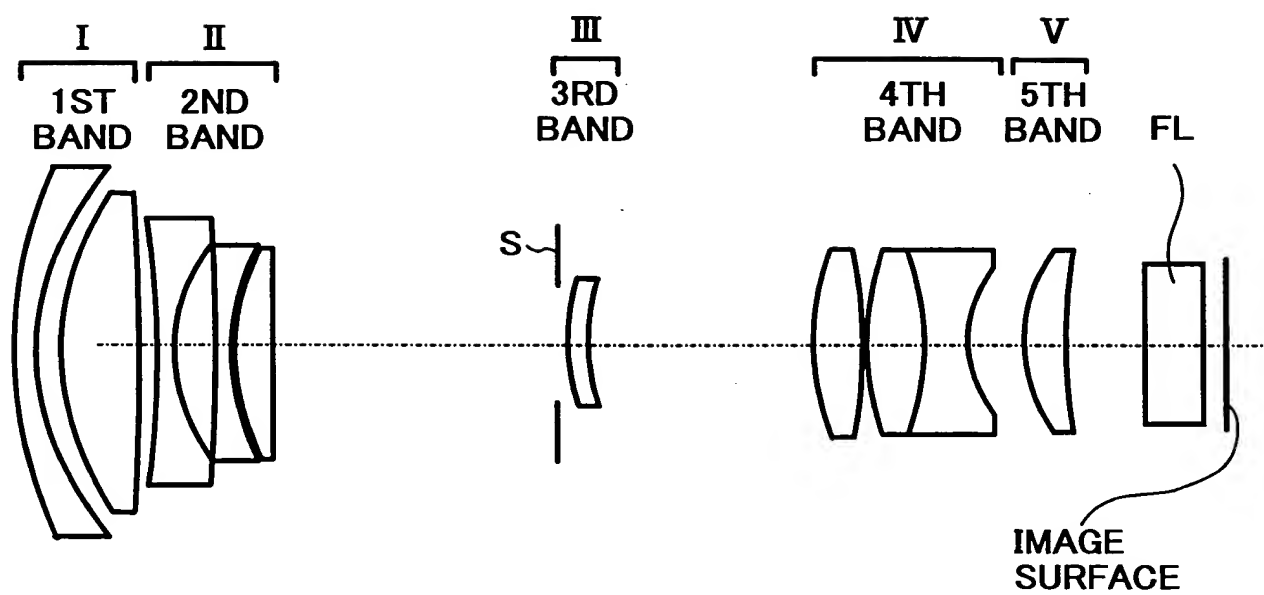


FIG. 5

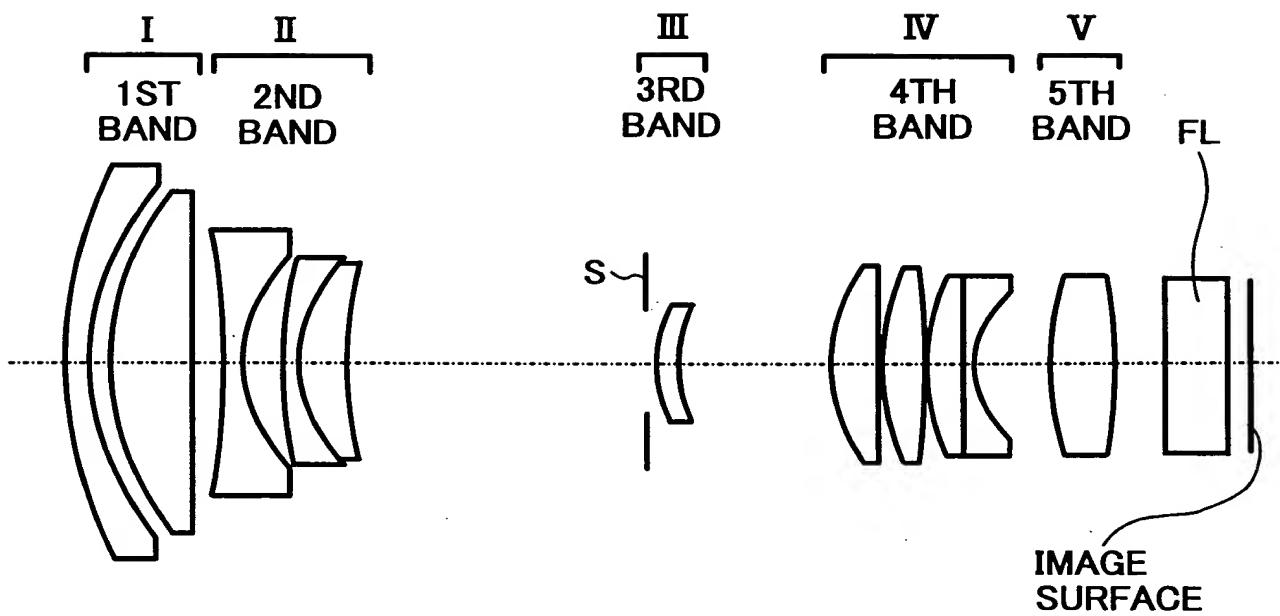


FIG. 6

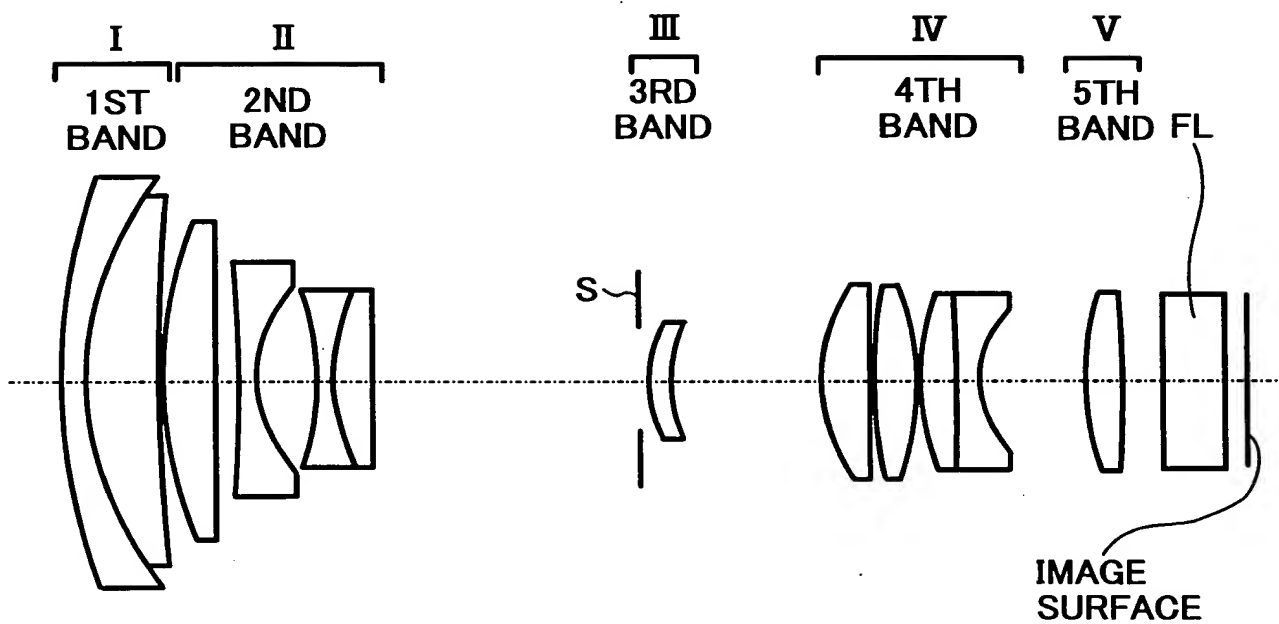


FIG. 7

SHORT FOCAL POINT END EXP. 1

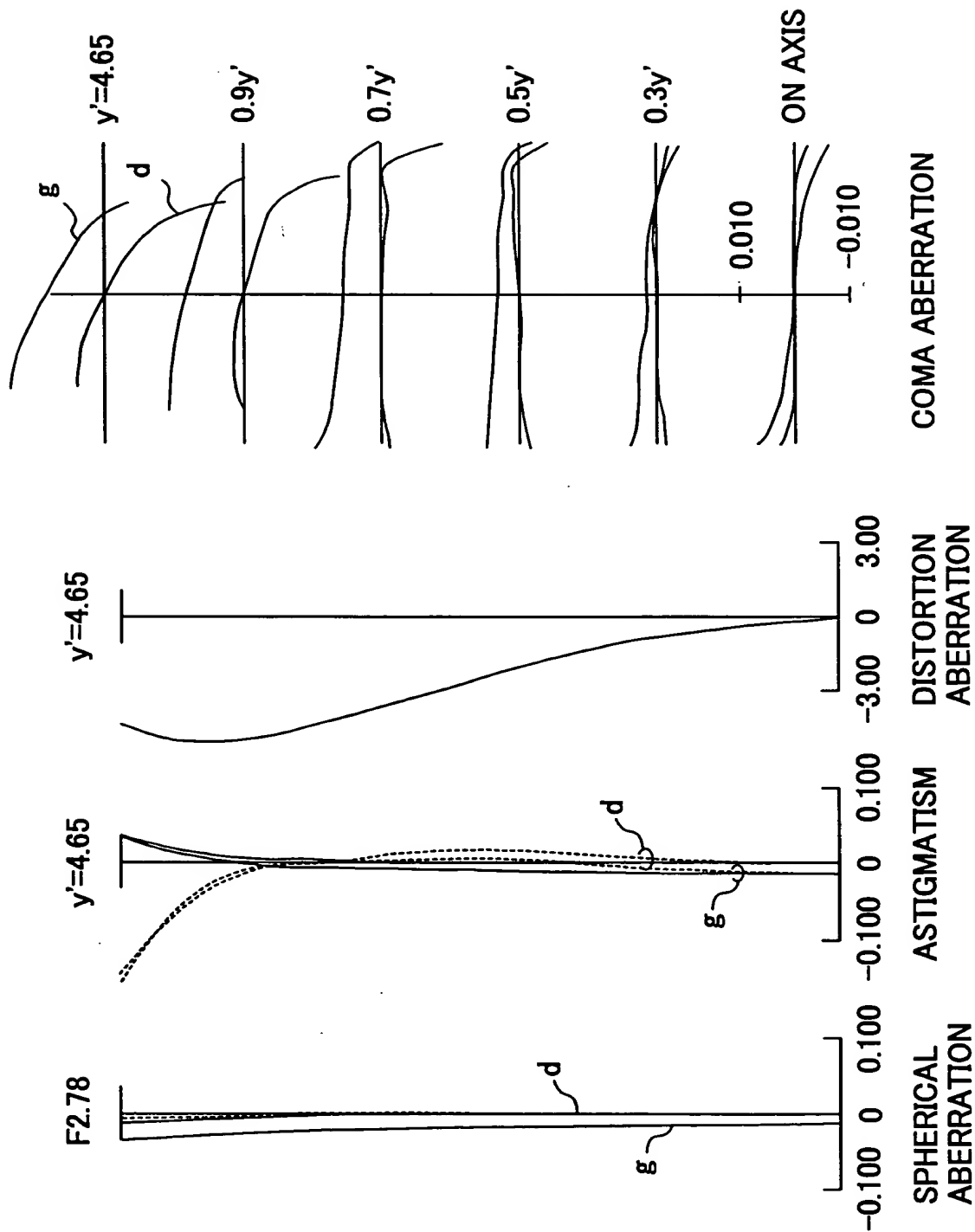
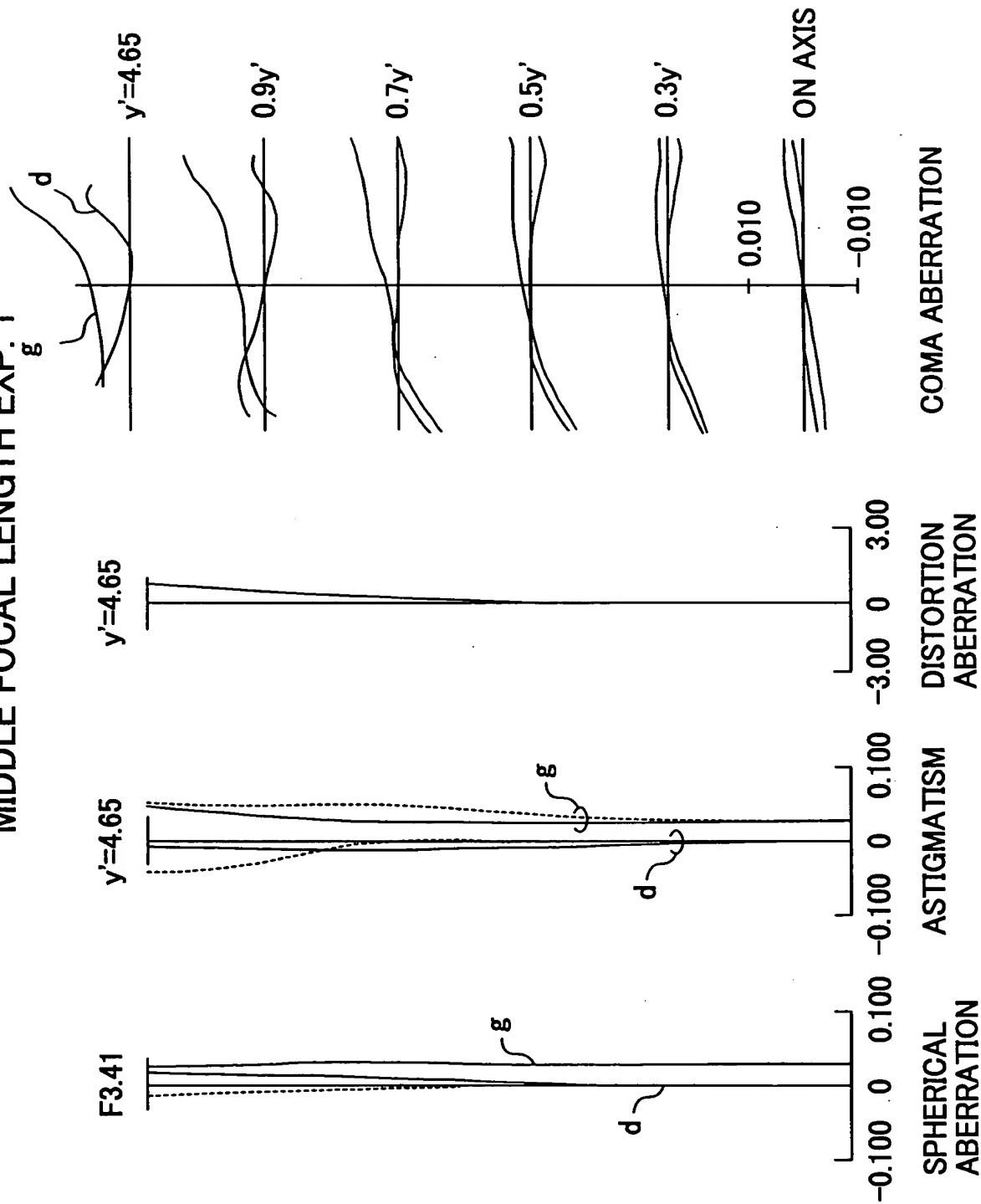


FIG. 8

MIDDLE FOCAL LENGTH EXP. 1



COMA ABERRATION

DISTORTION ABERRATION

ASTIGMATISM

SPHERICAL ABERRATION

FIG. 9
LONG FOCAL POINT END EXP.1

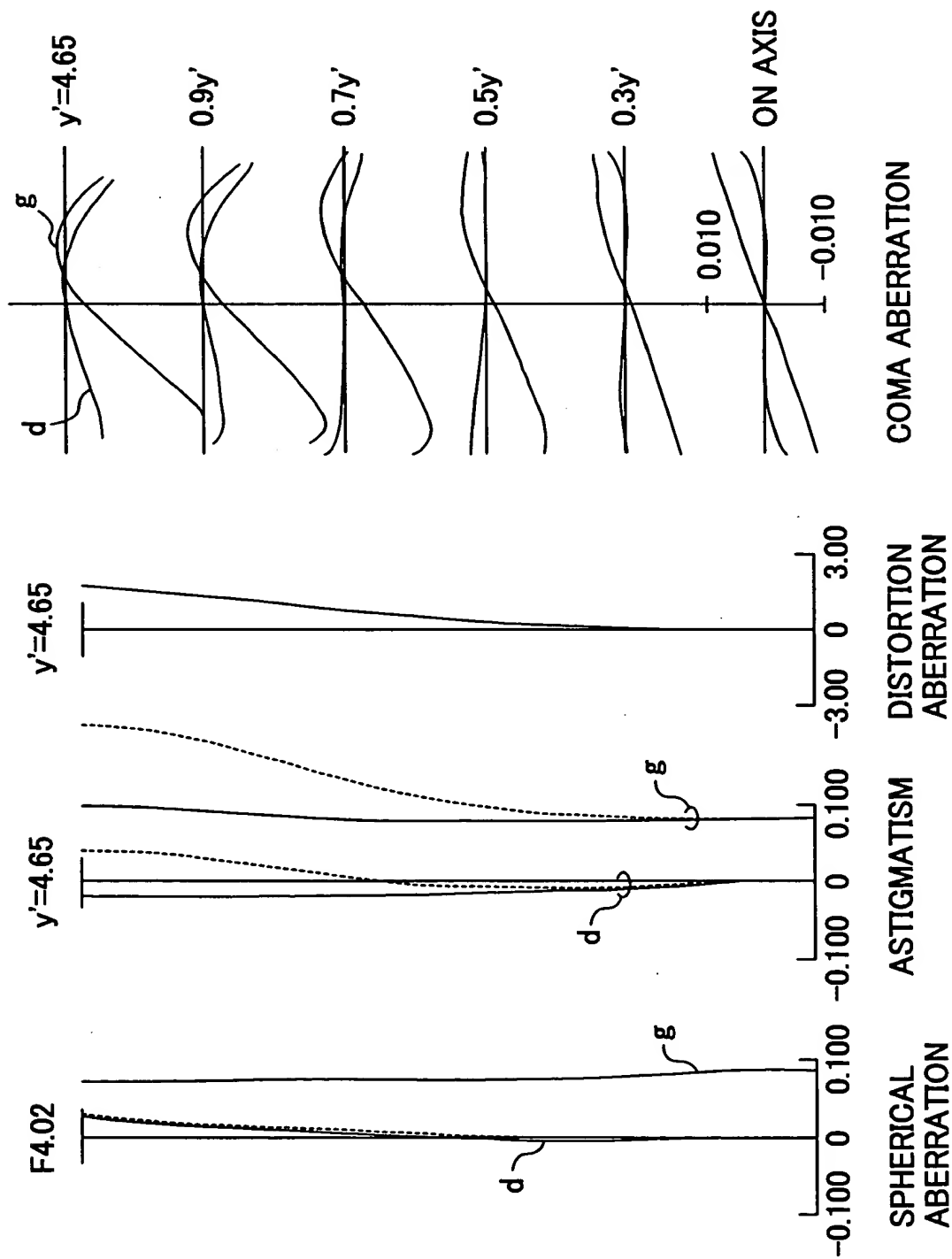


FIG. 10

SHORT FOCAL POINT END EXP.2

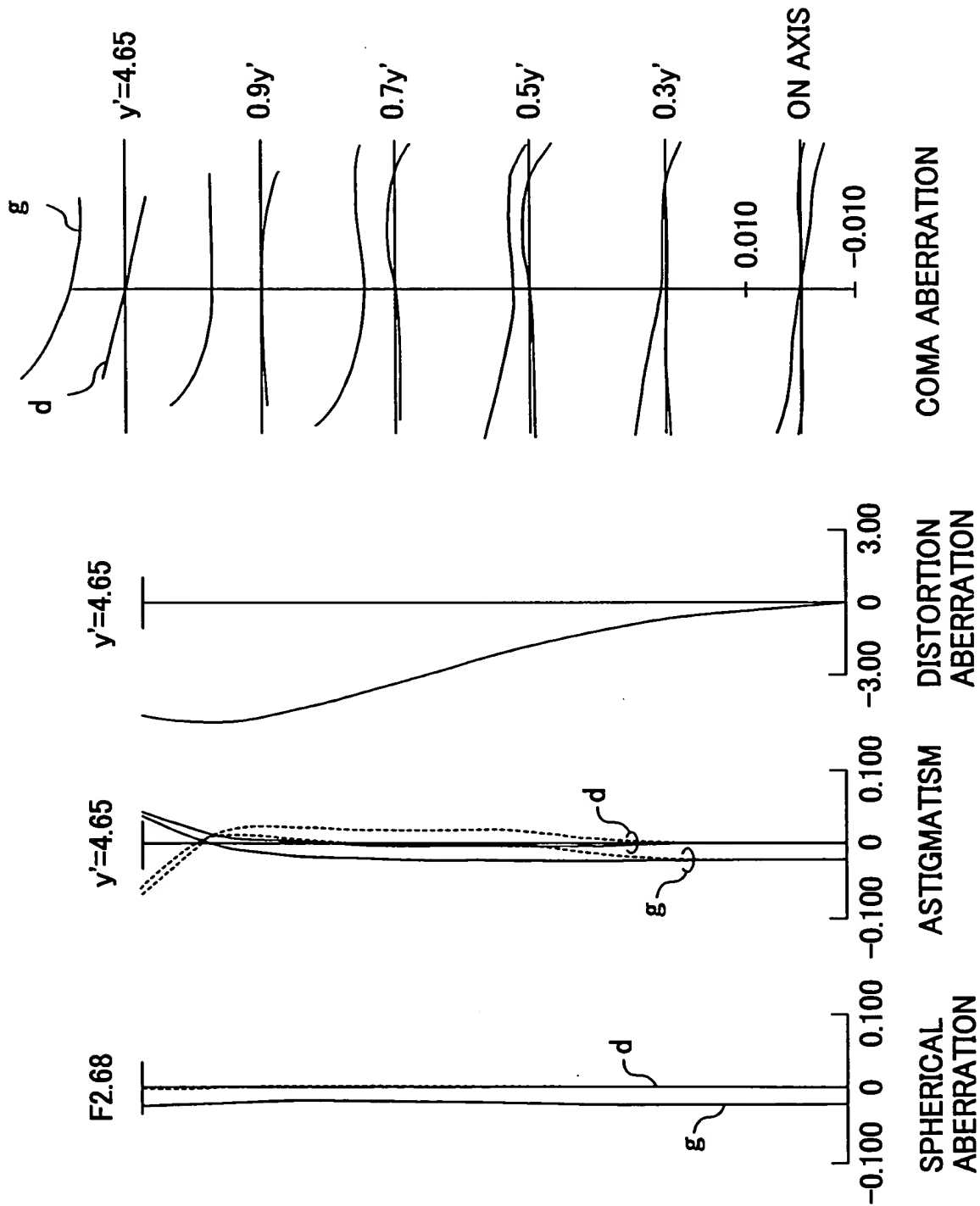
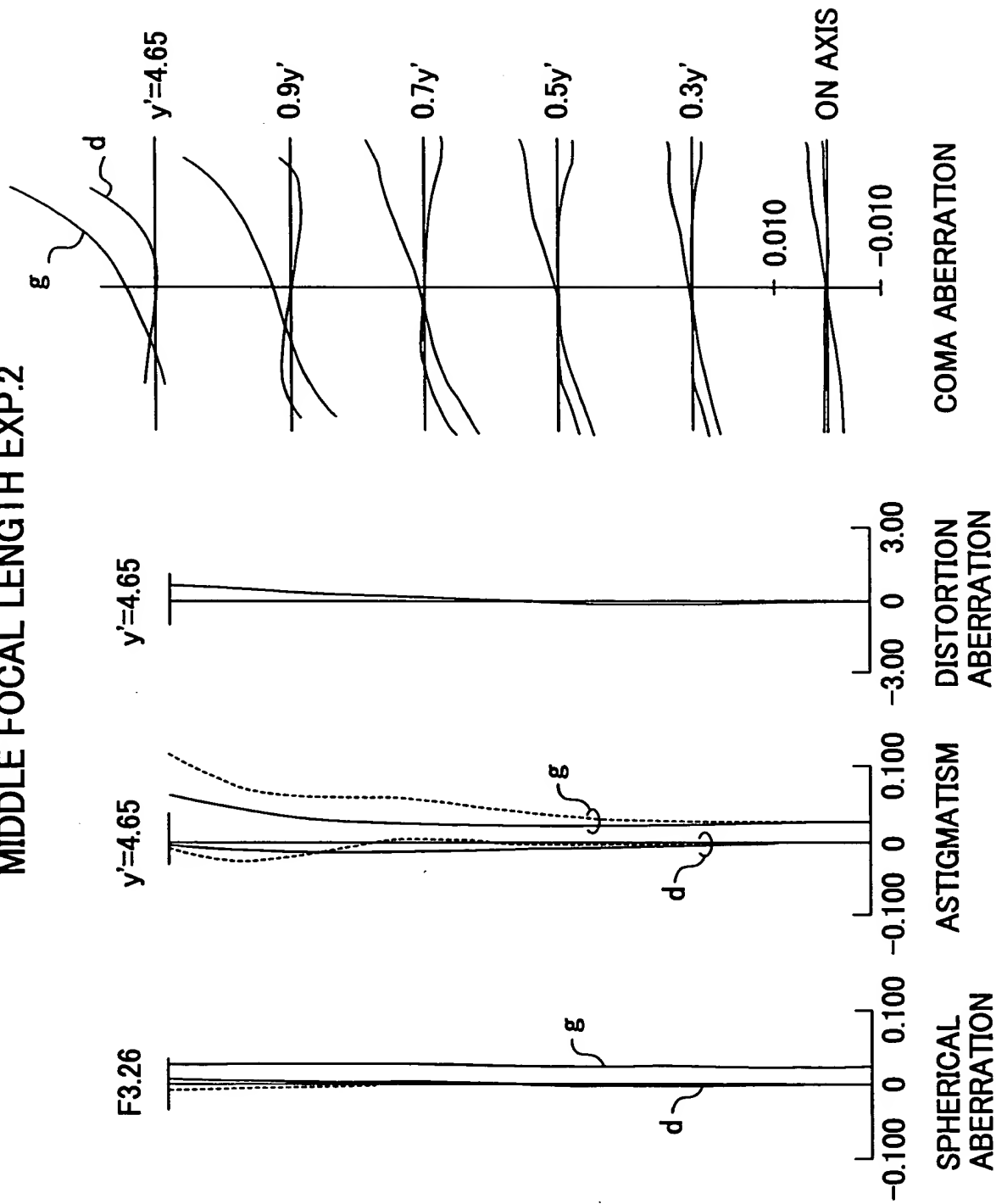


FIG. 11

MIDDLE FOCAL LENGTH EXP.2



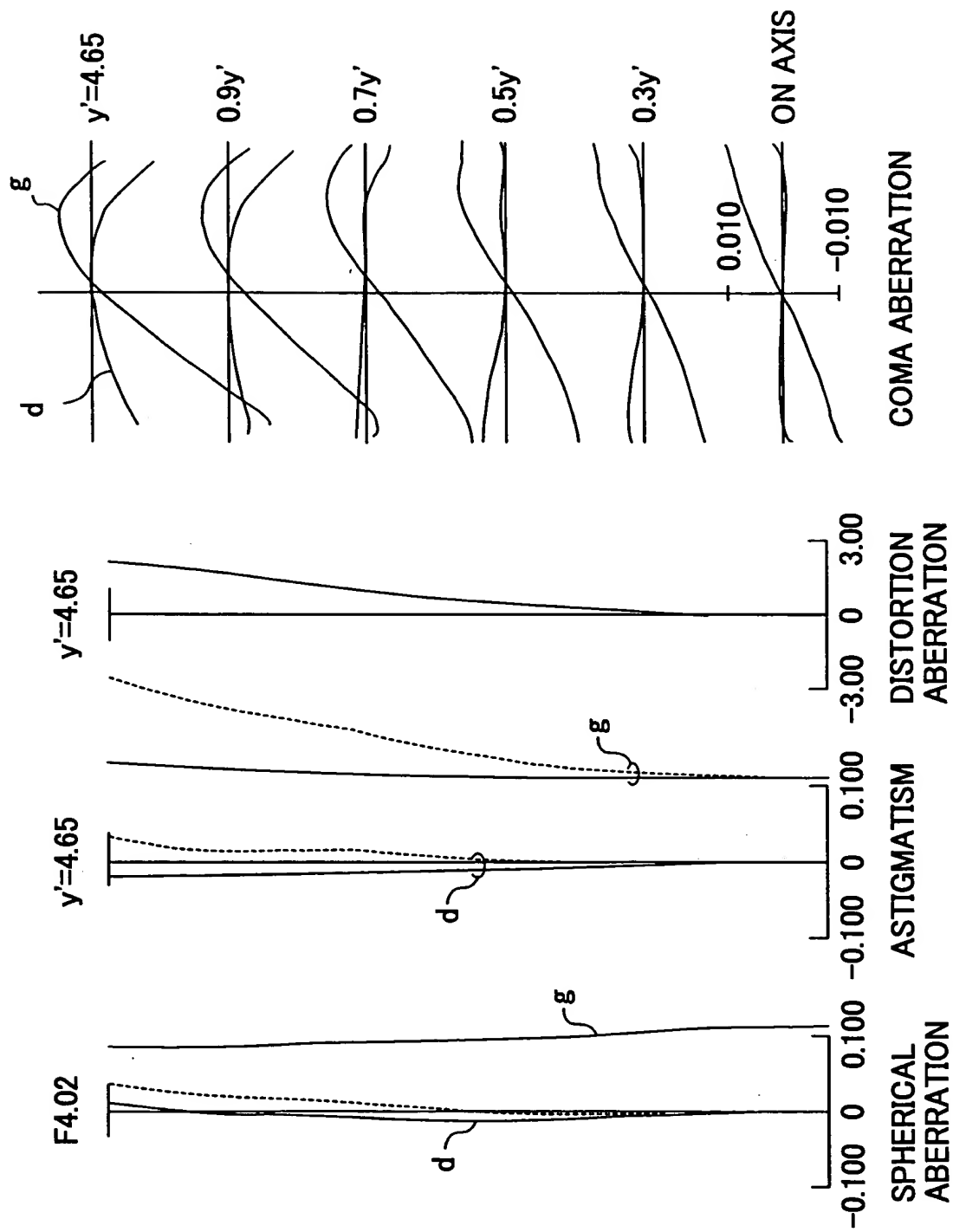


FIG. 13

SHORT FOCAL POINT END EXP.3

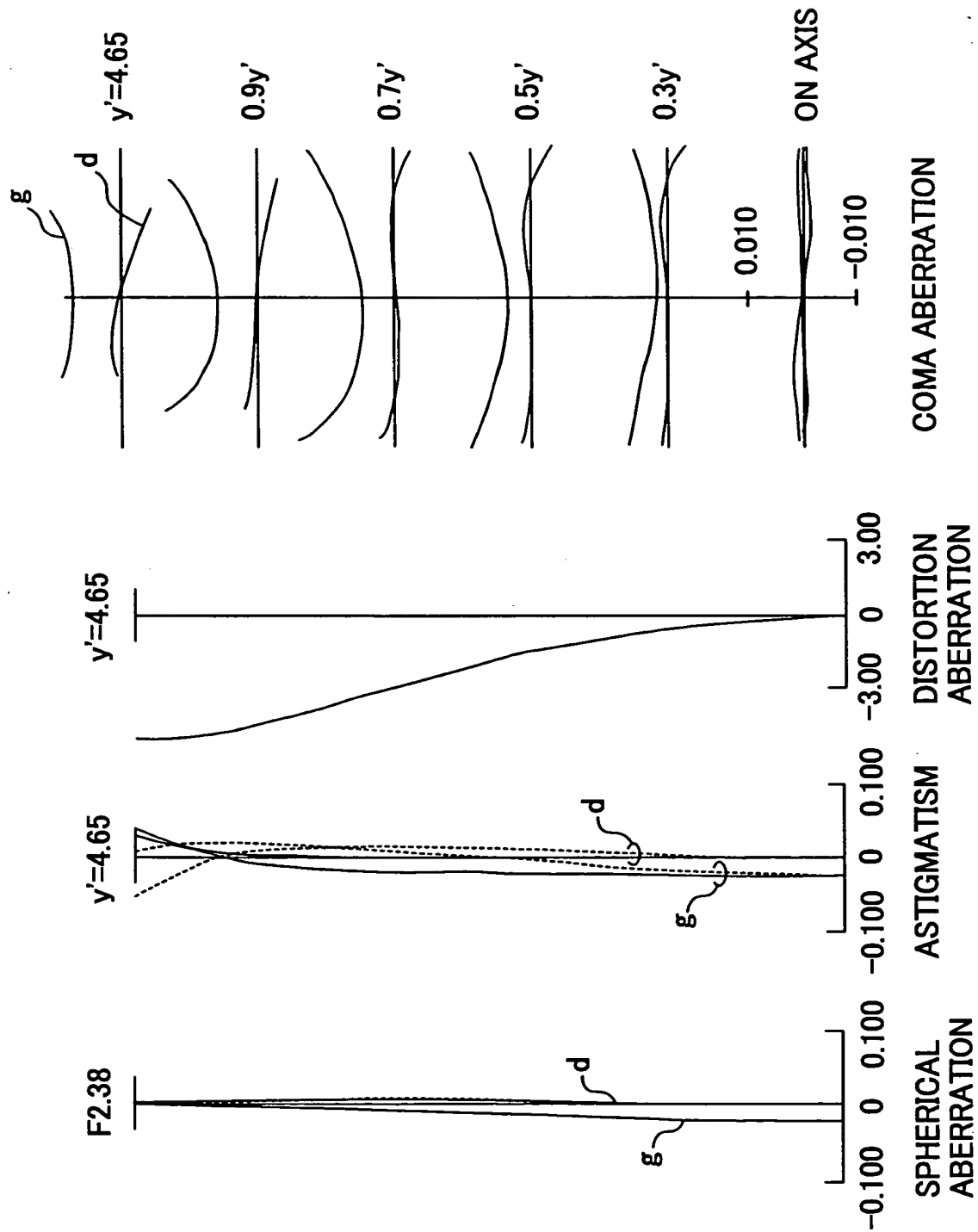


FIG. 14

MIDDLE FOCAL LENGTH EXP.3

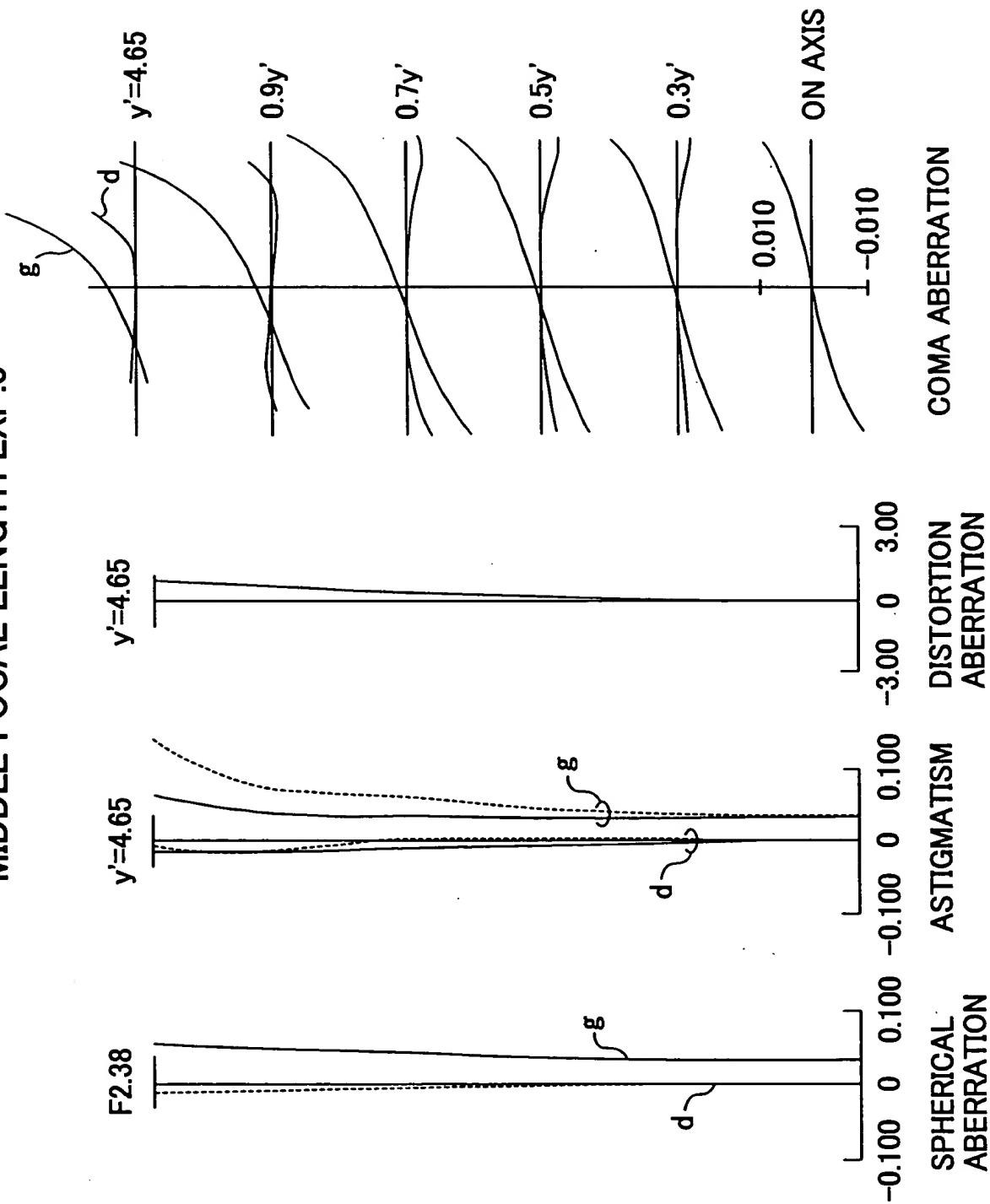


FIG. 15

LONG FOCAL POINT END EXP.3

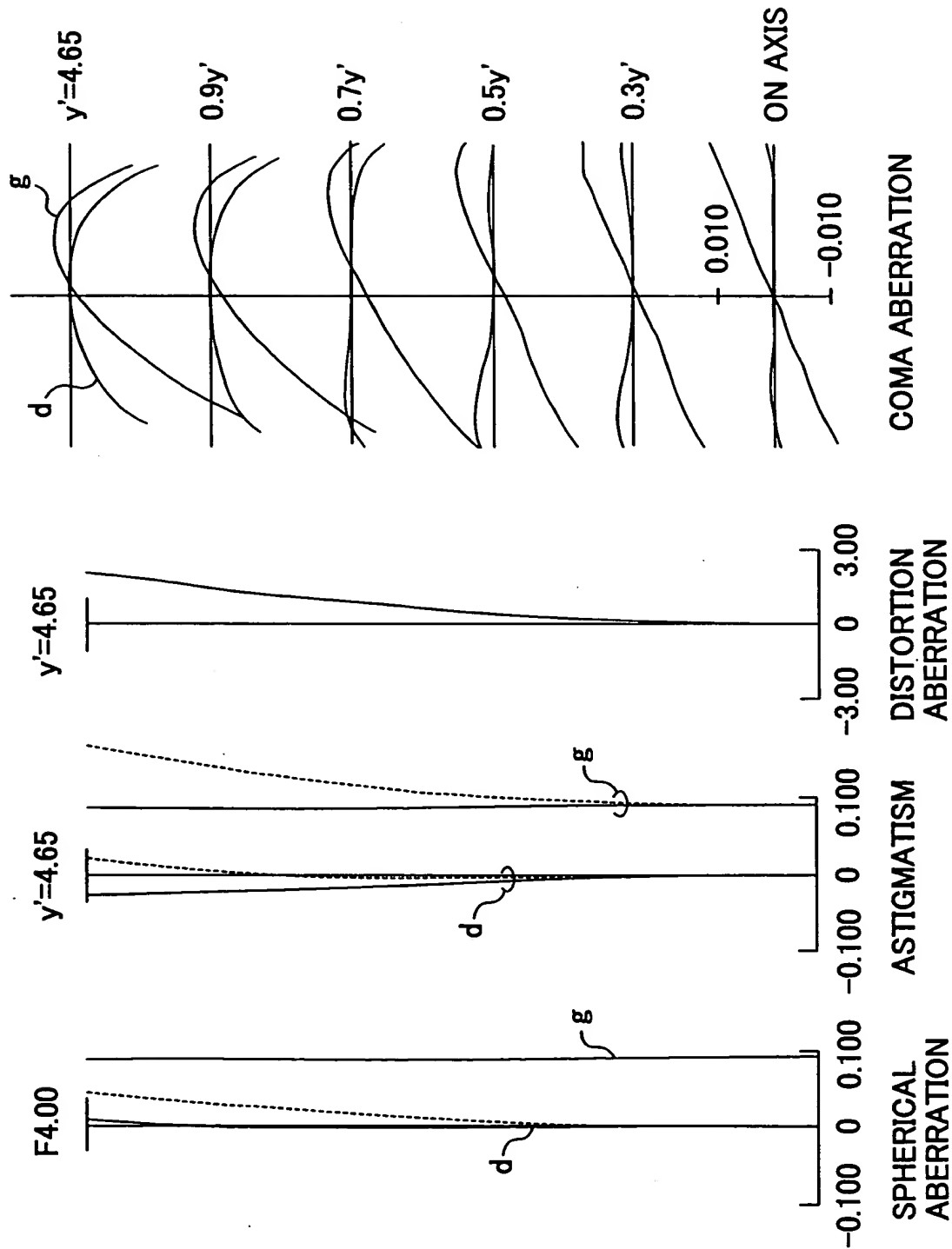


FIG. 16

SHORT FOCAL POINT END EXP.4

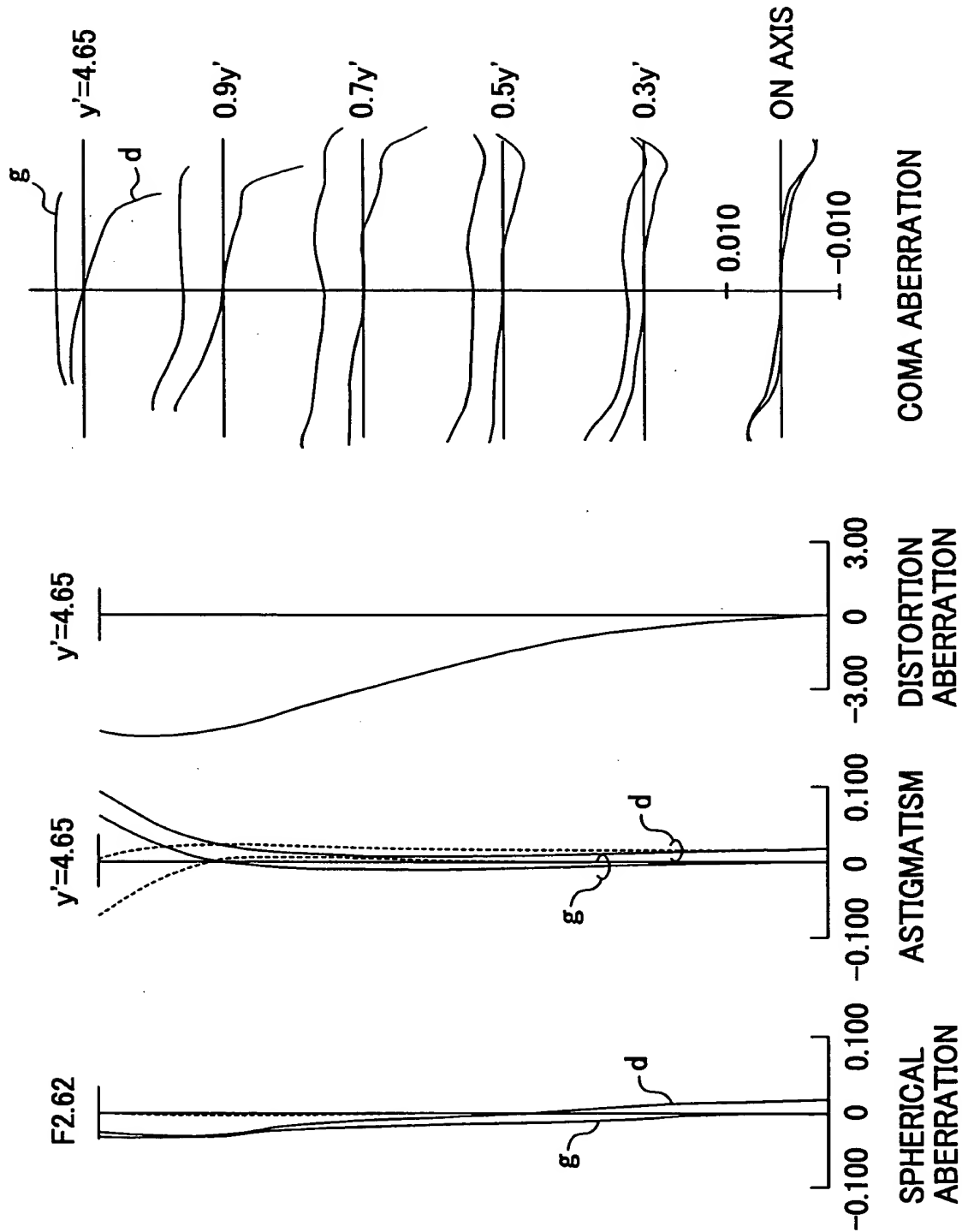


FIG. 17
MIDDLE FOCAL LENGTH EXP.4

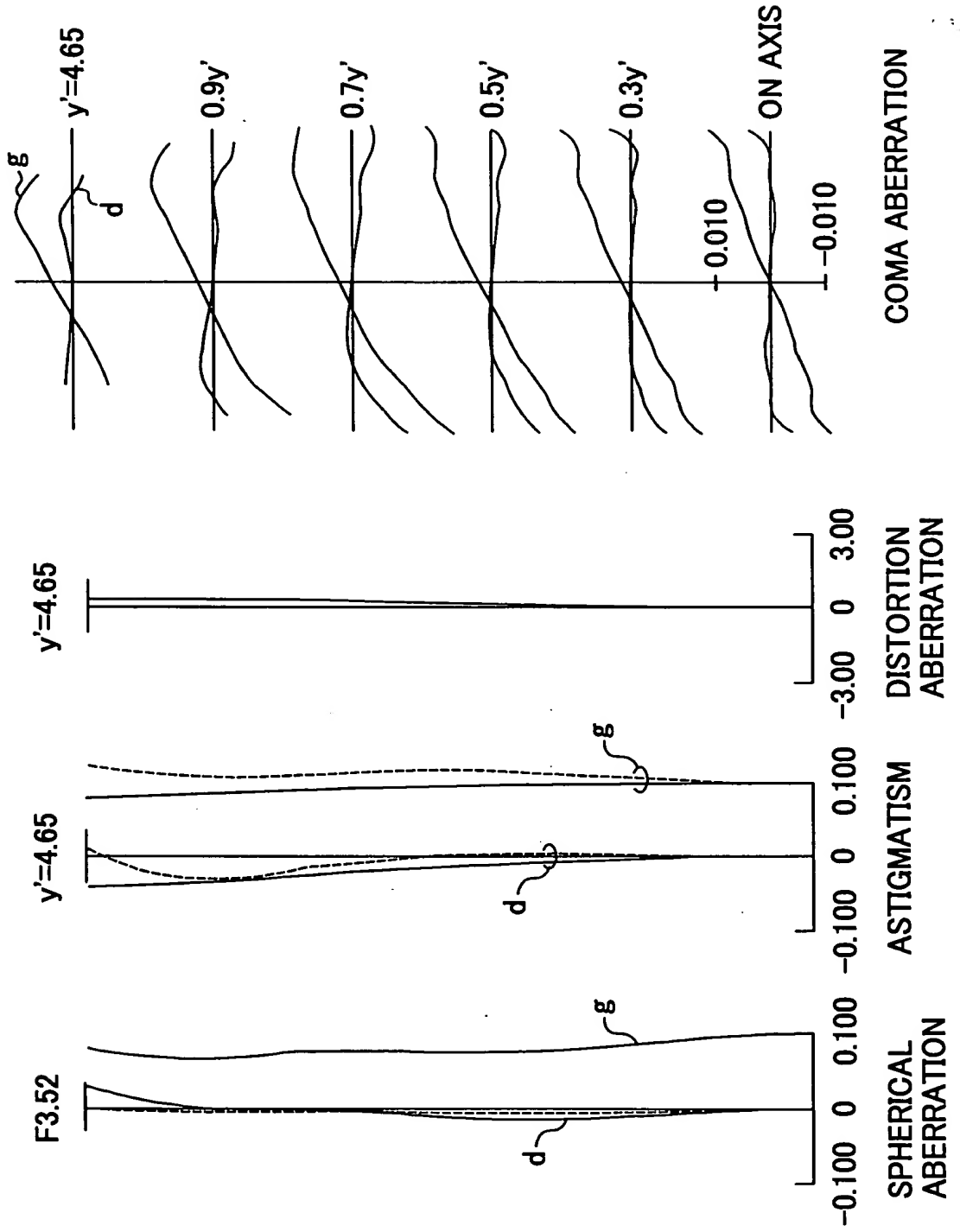


FIG. 18
LONG FOCAL POINT END EXP.4

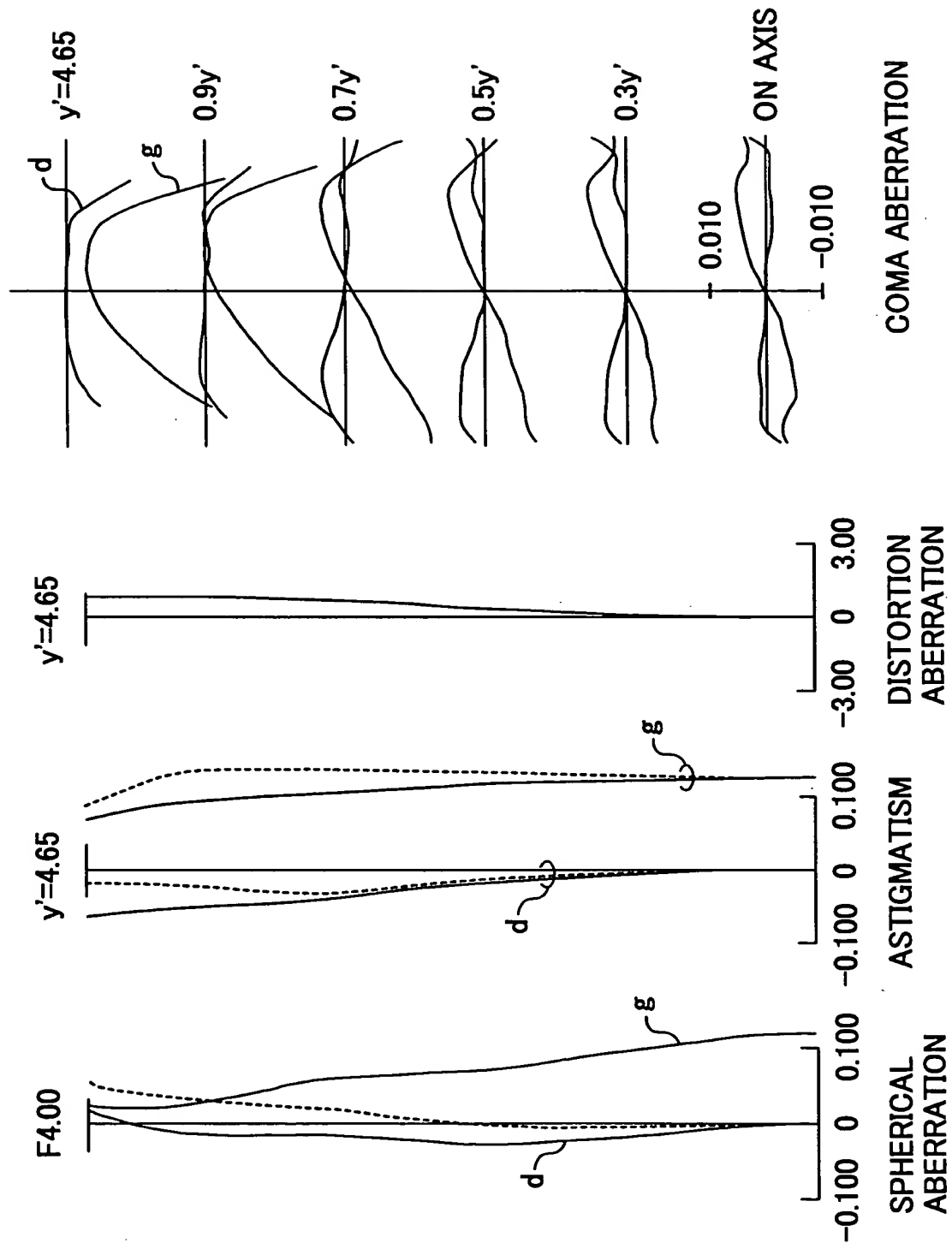


FIG. 19

SHORT FOCAL POINT END EXP.5

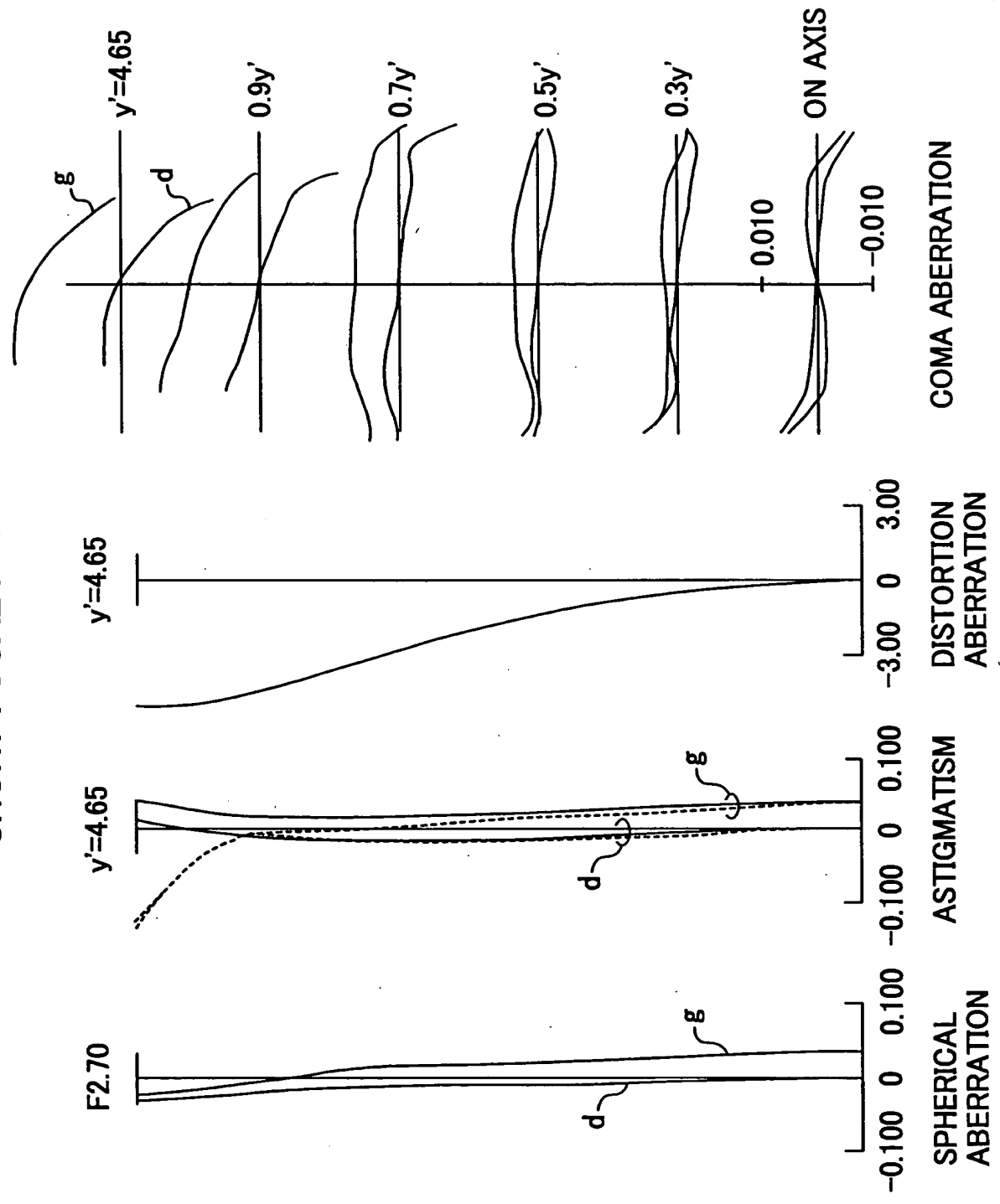


FIG. 20

MIDDLE FOCAL LENGTH EXP.5

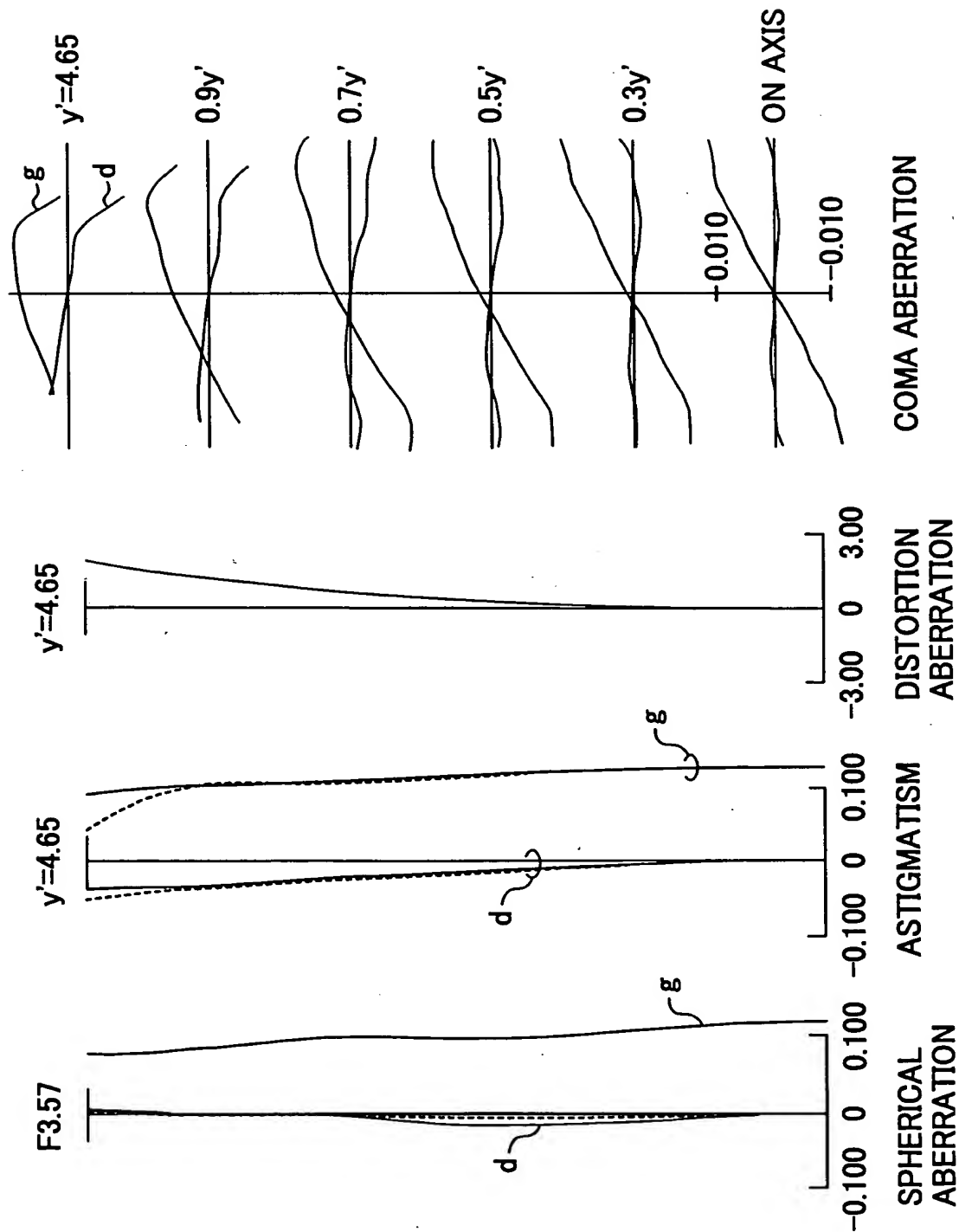


FIG. 21

LONG FOCAL POINT END EXP.5

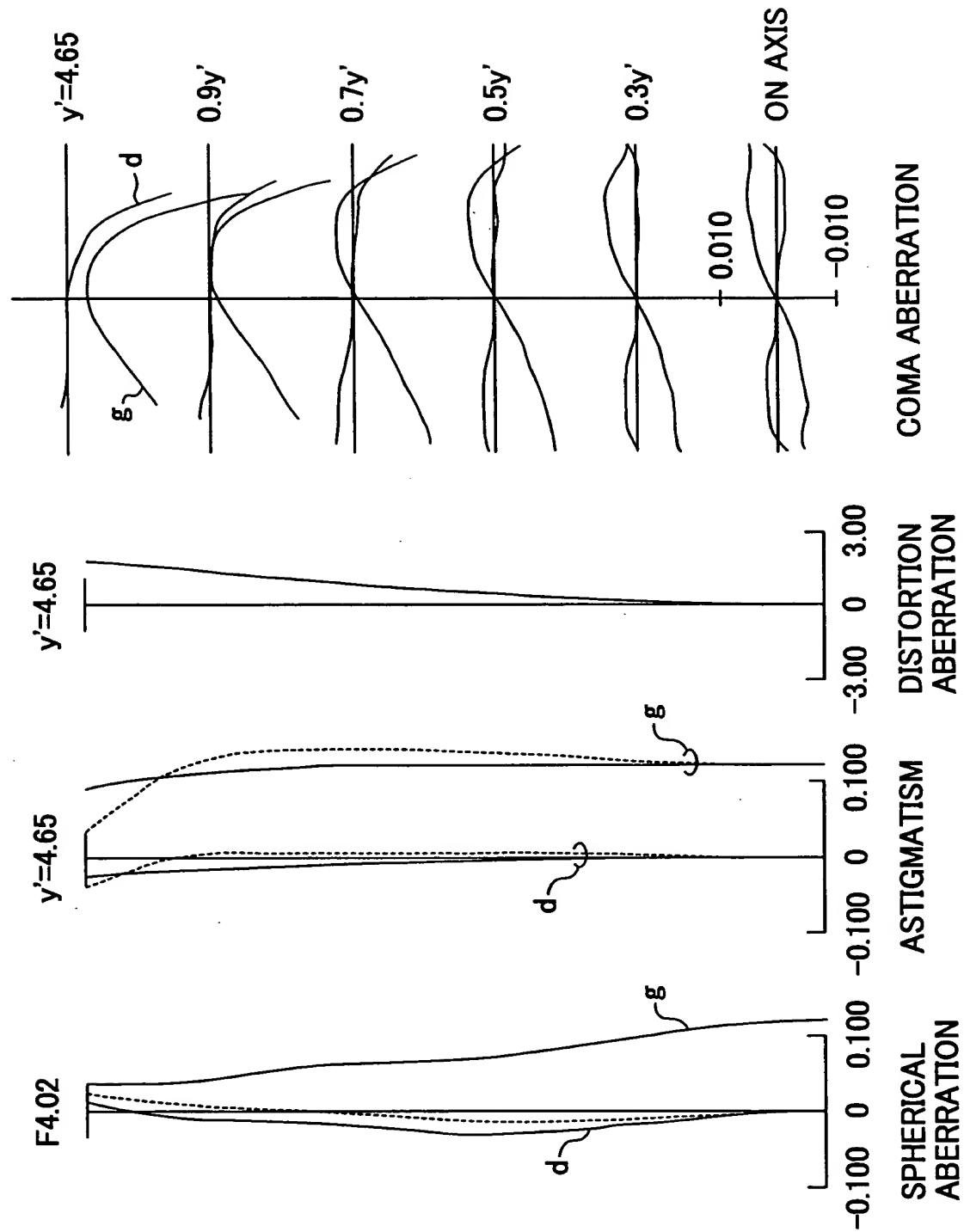


FIG. 22A

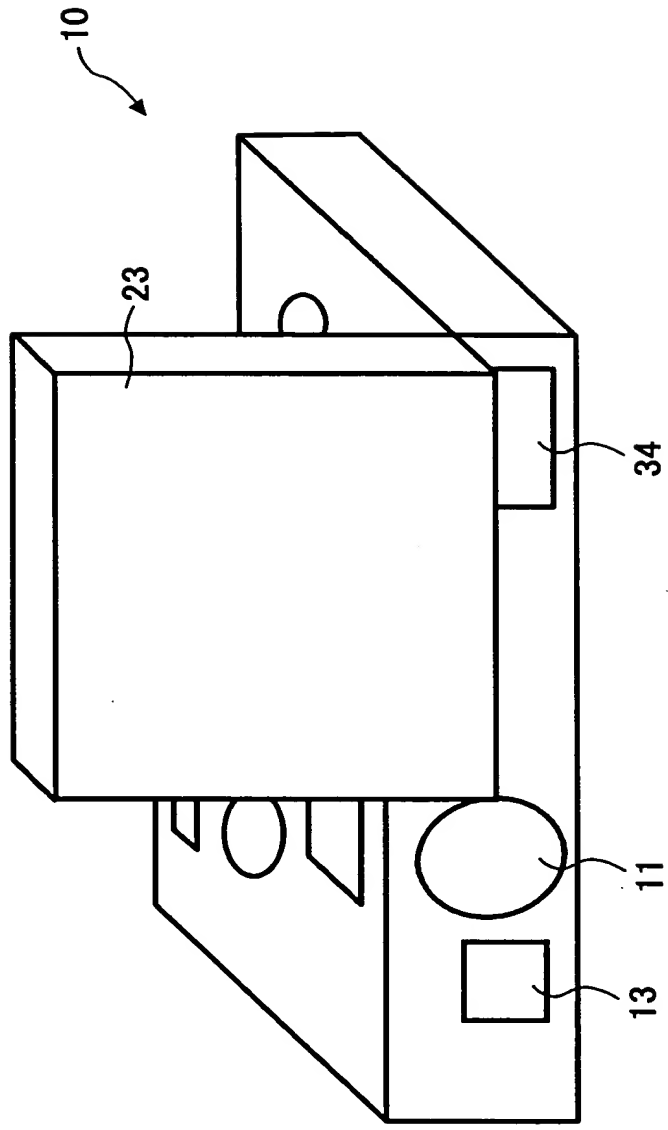


FIG. 22B

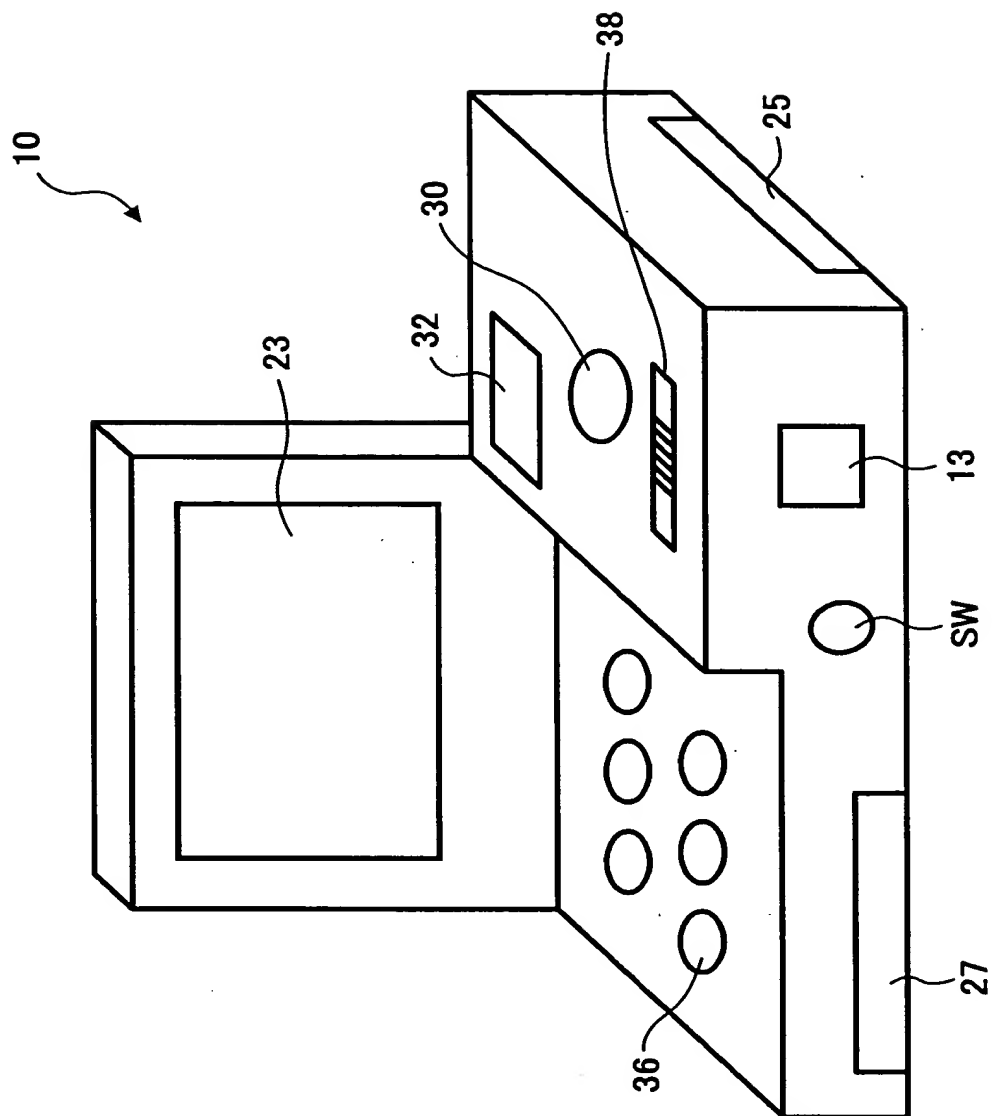


FIG. 22C

10

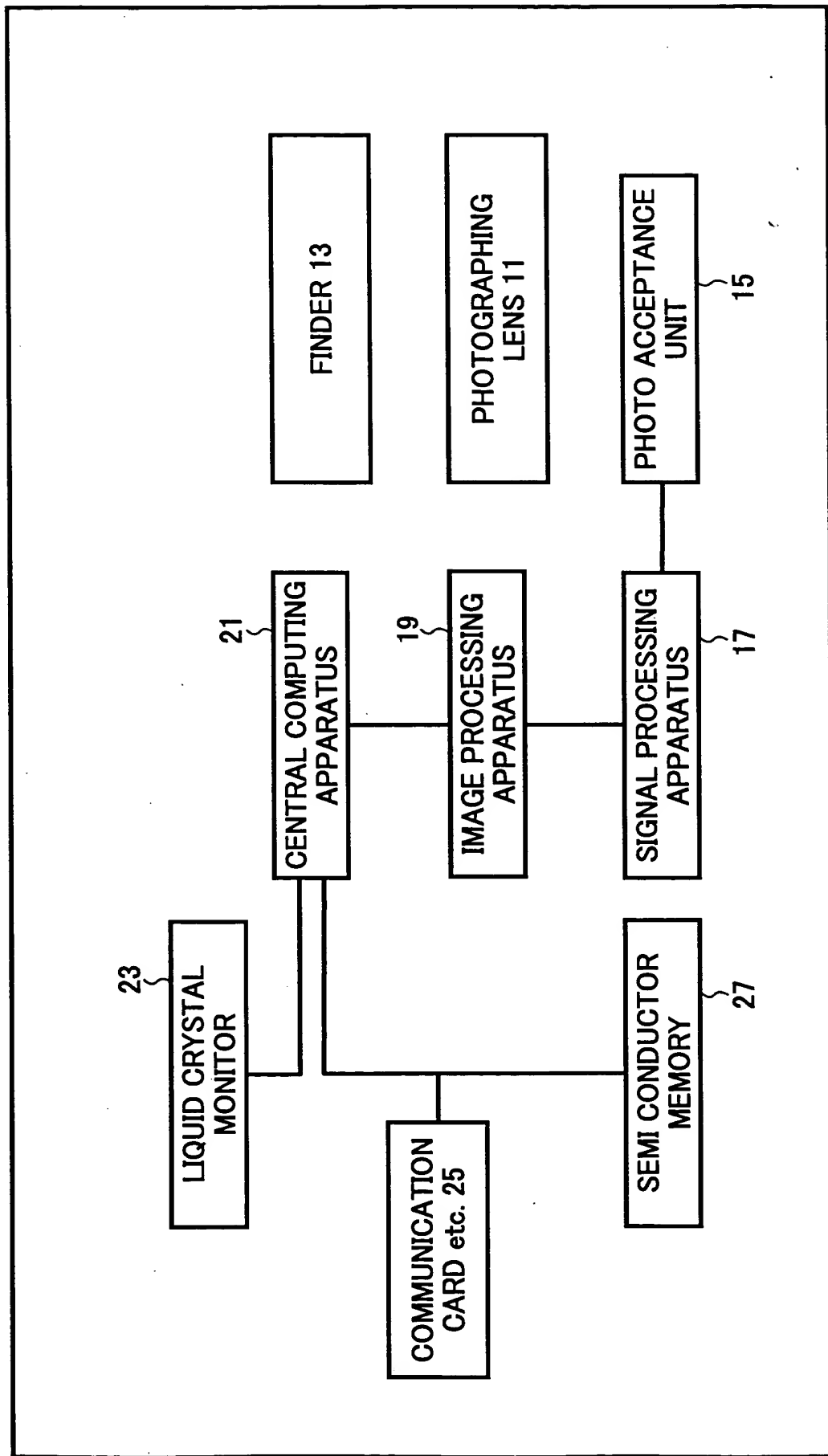


FIG. 23A

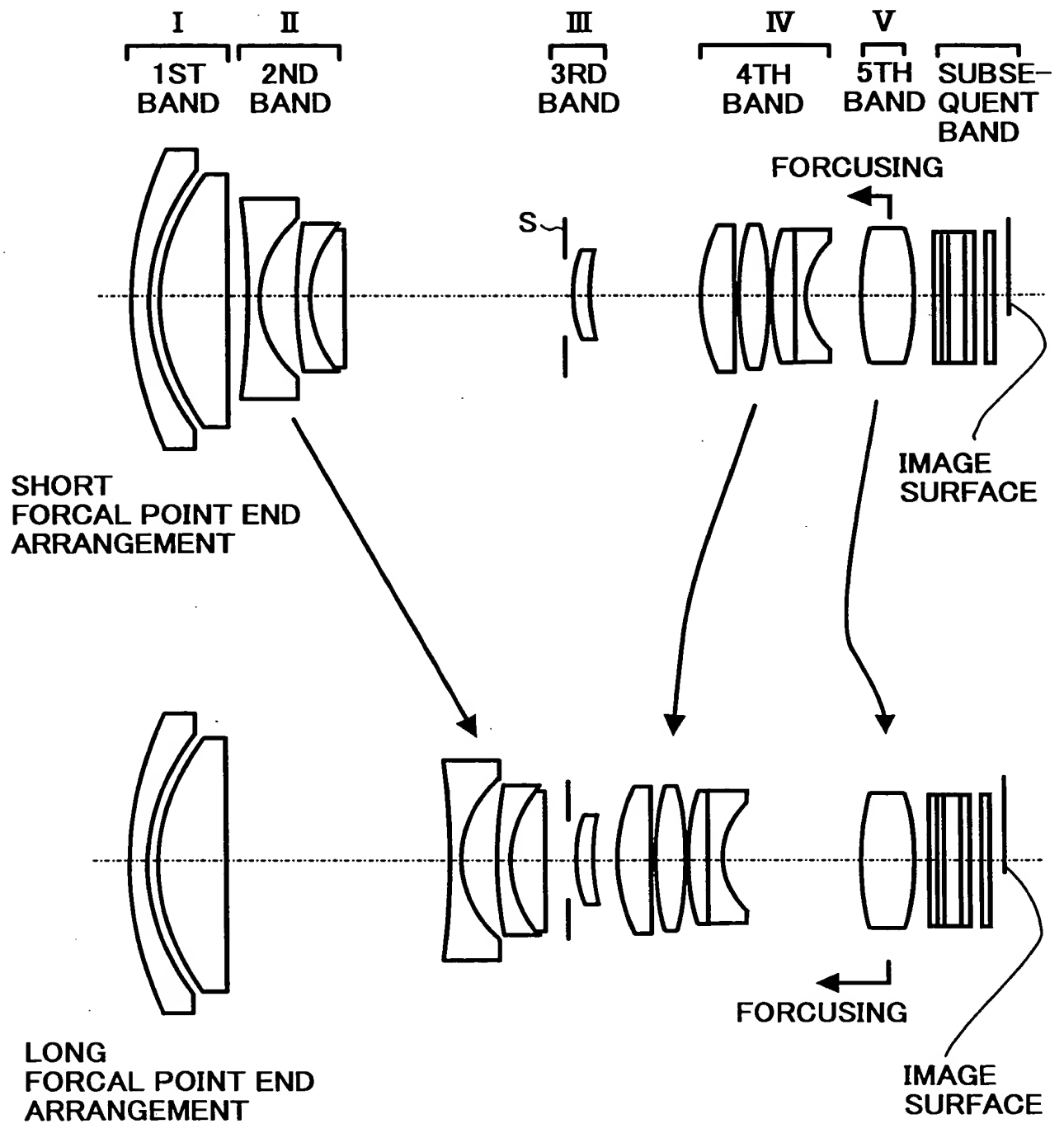


FIG. 23A

FIG. 23B

MACRO
MODE
ARRANGEMENT

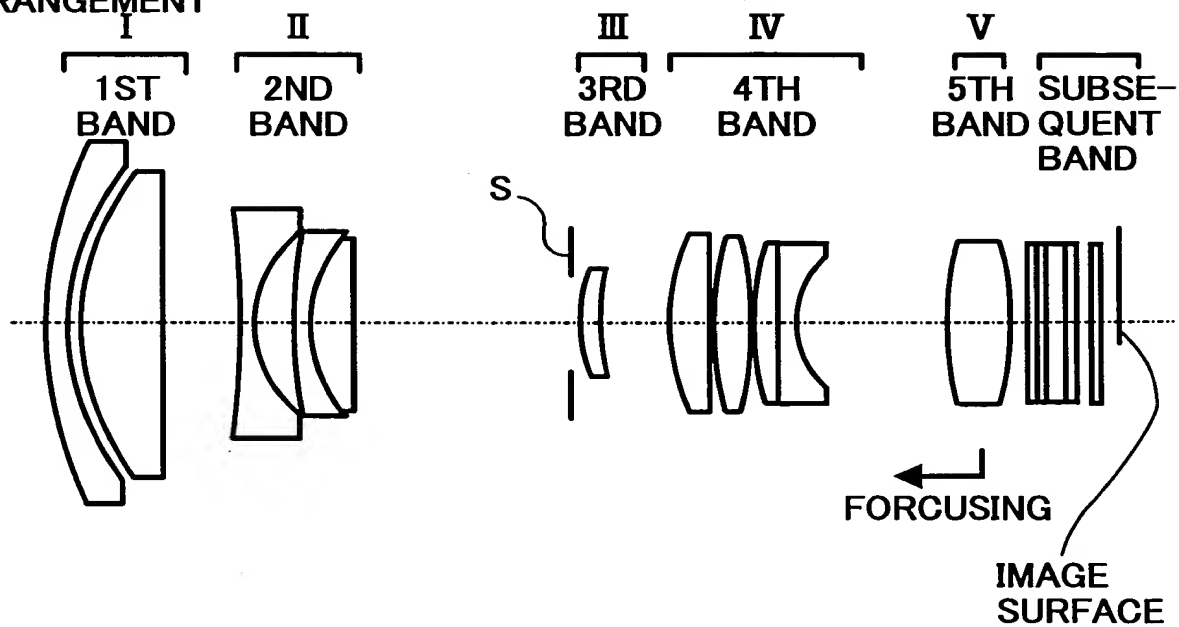
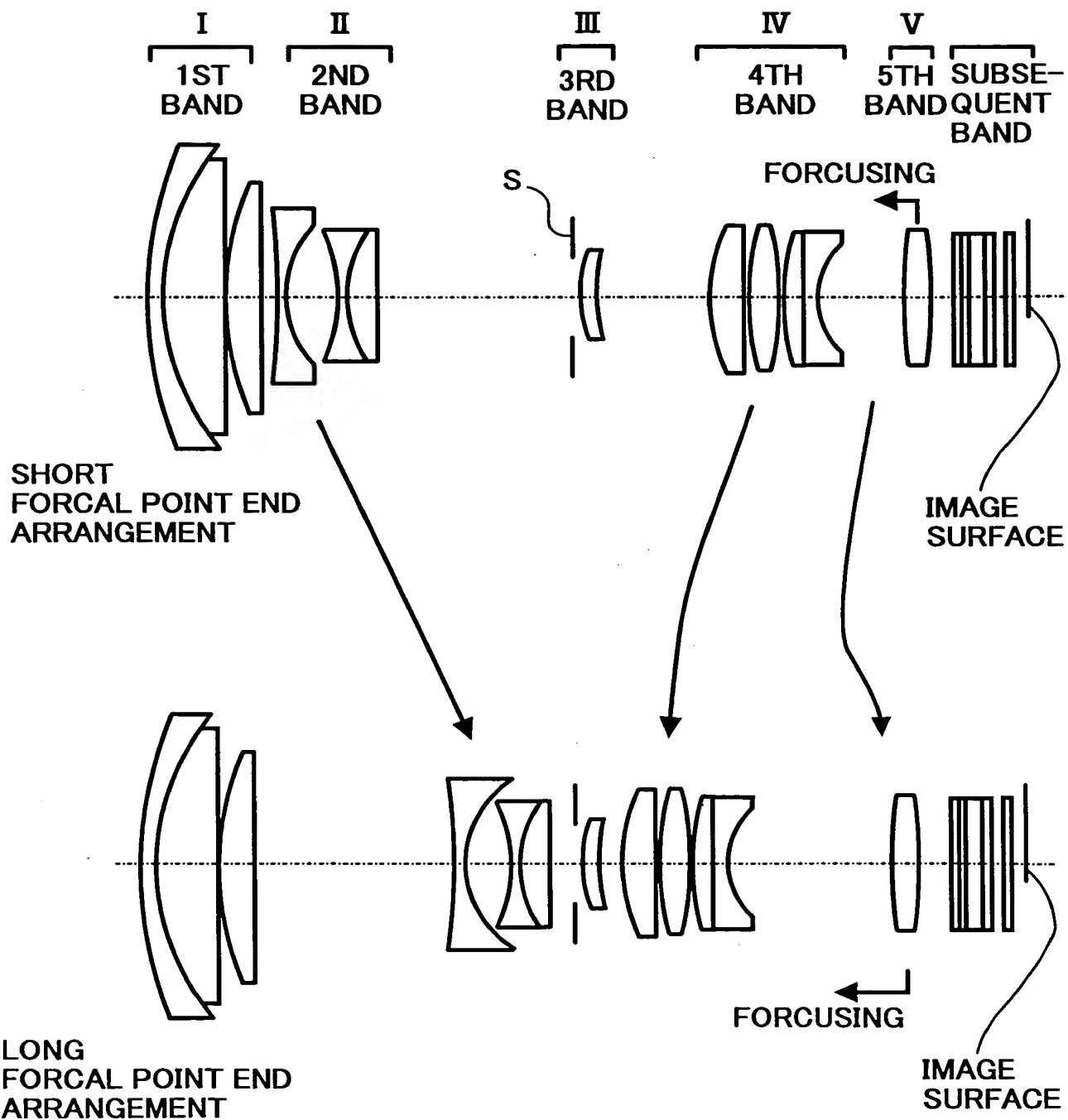


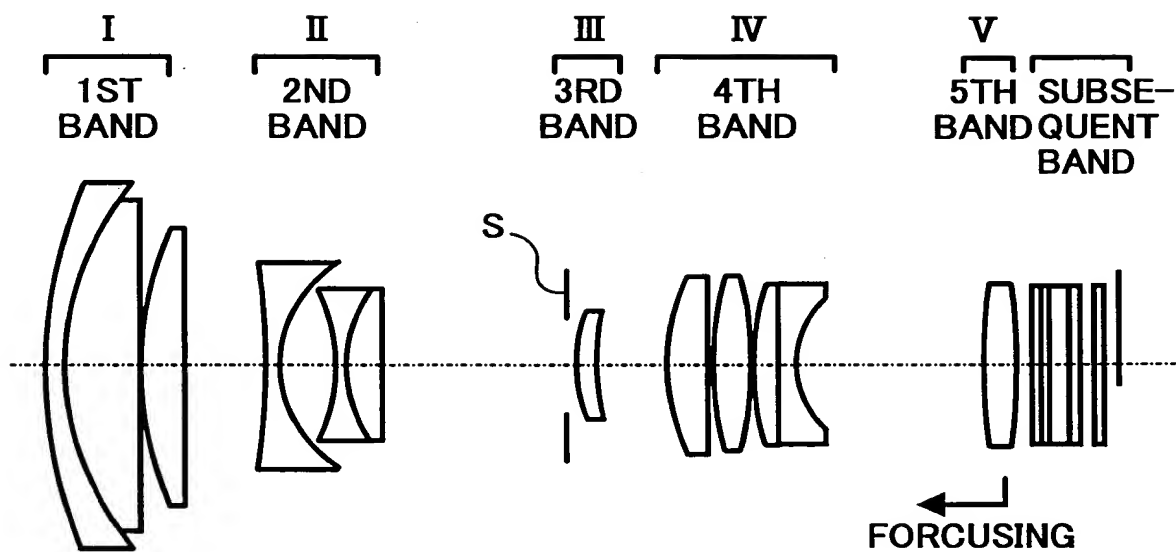
FIG. 24A



00999 26433660

FIG. 24B

MACRO
MODE
ARRANGEMENT



080936-1

LONG FORCAL POINT END ARRANGEMENT

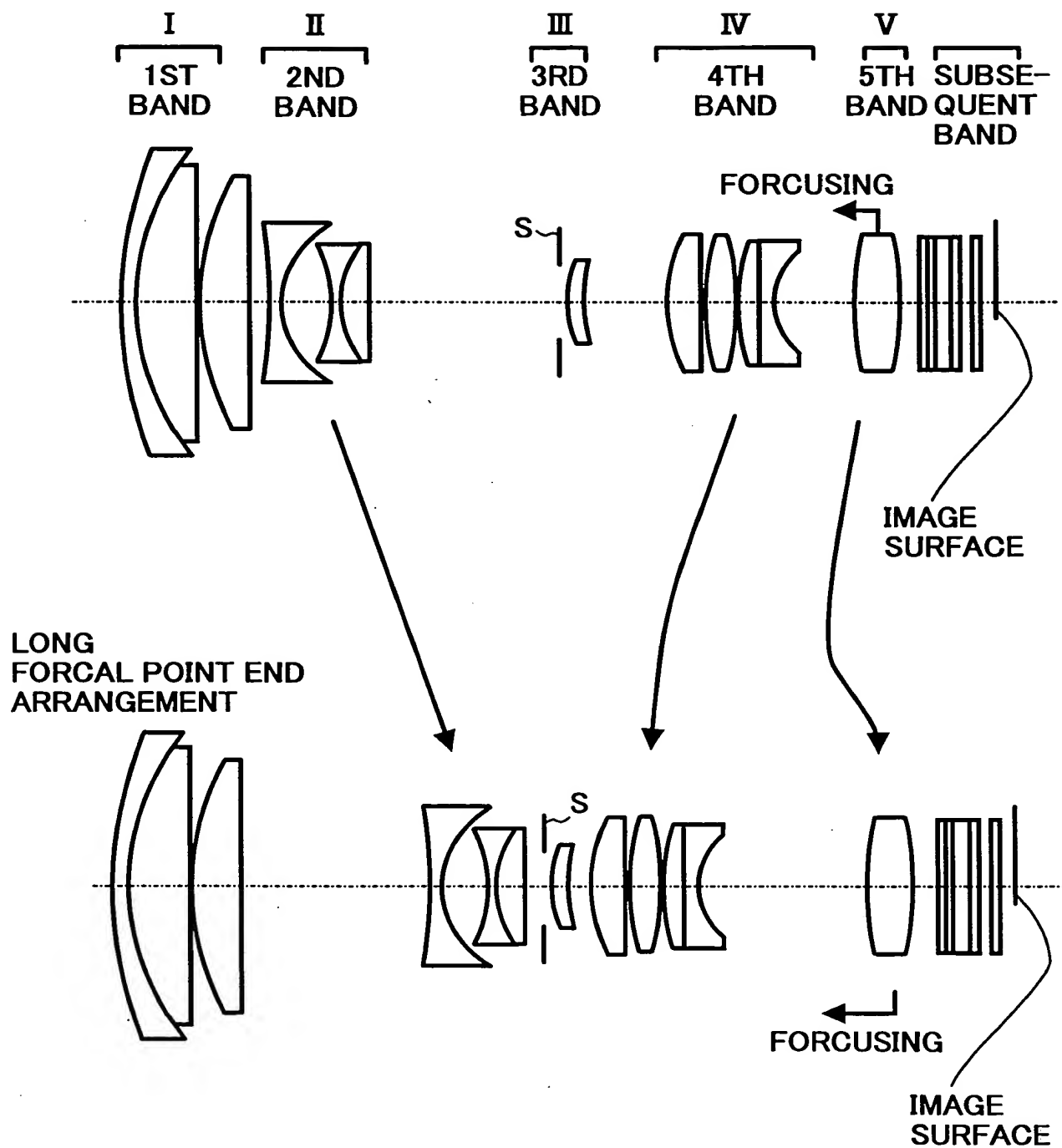


FIG. 25B

MACRO
MODE
ARRANGEMENT

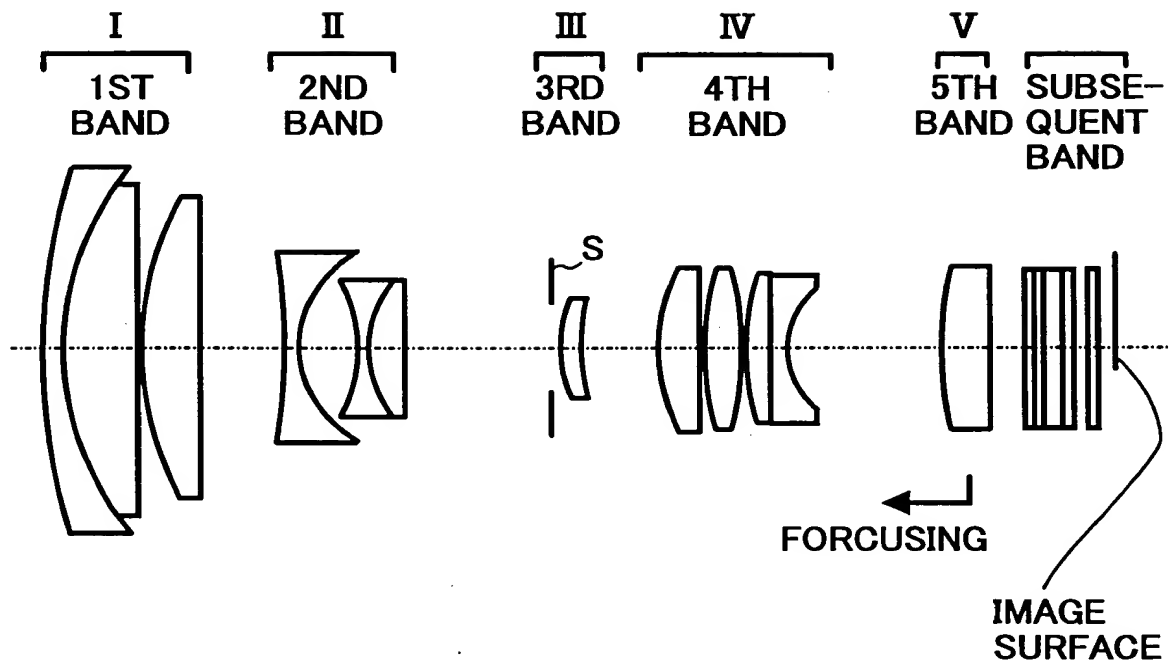


FIG. 26

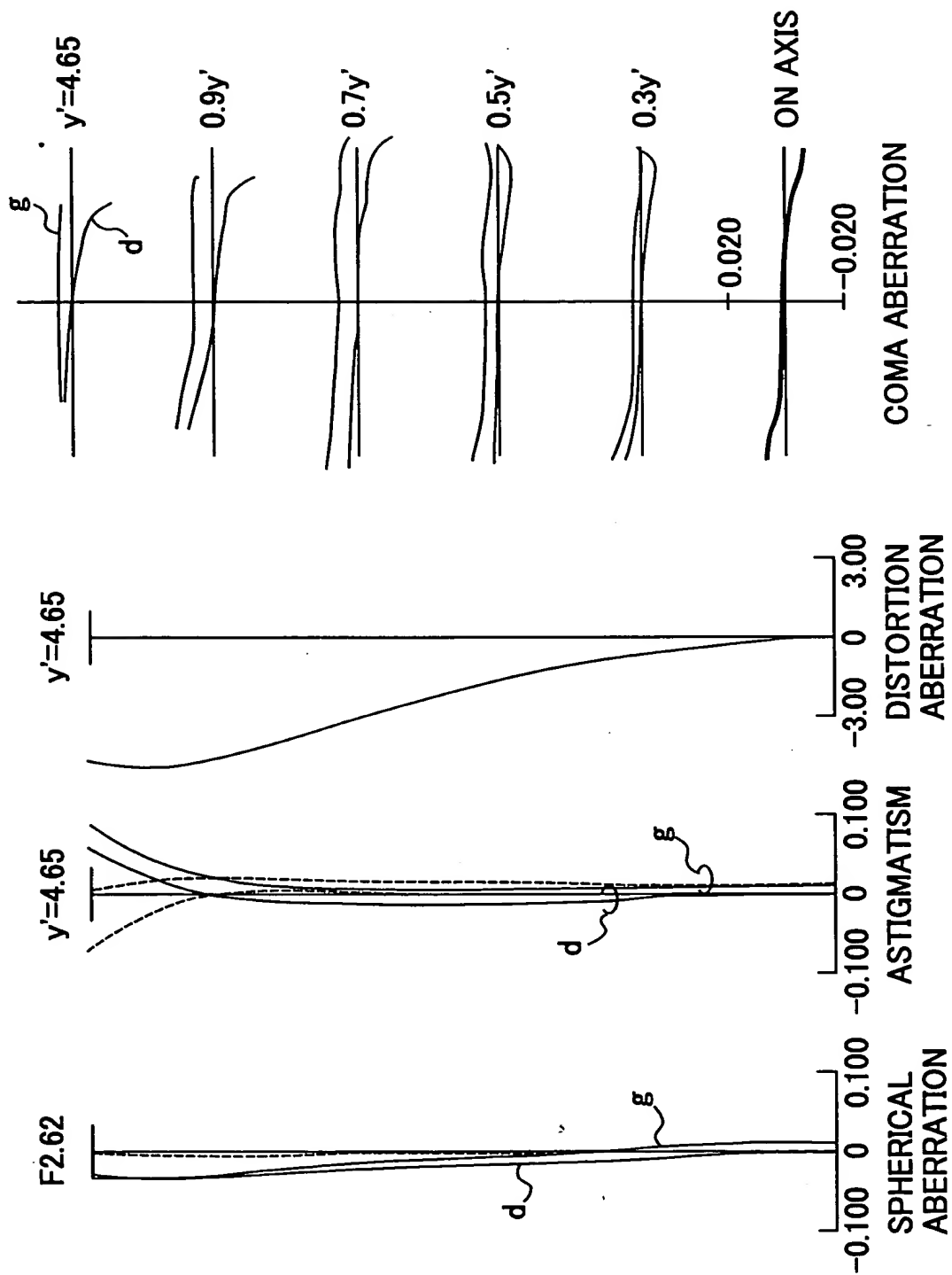


FIG. 27

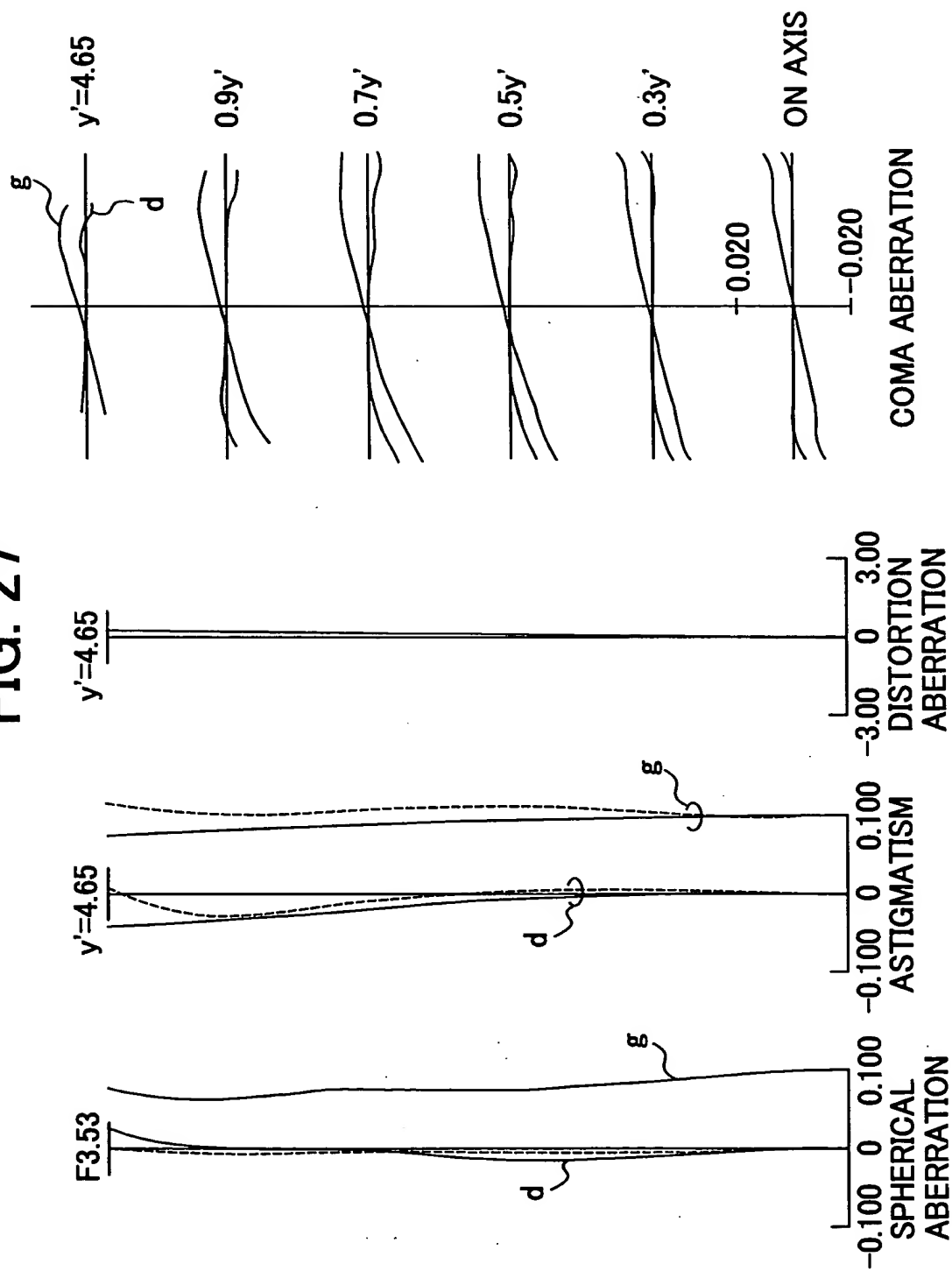


FIG. 28

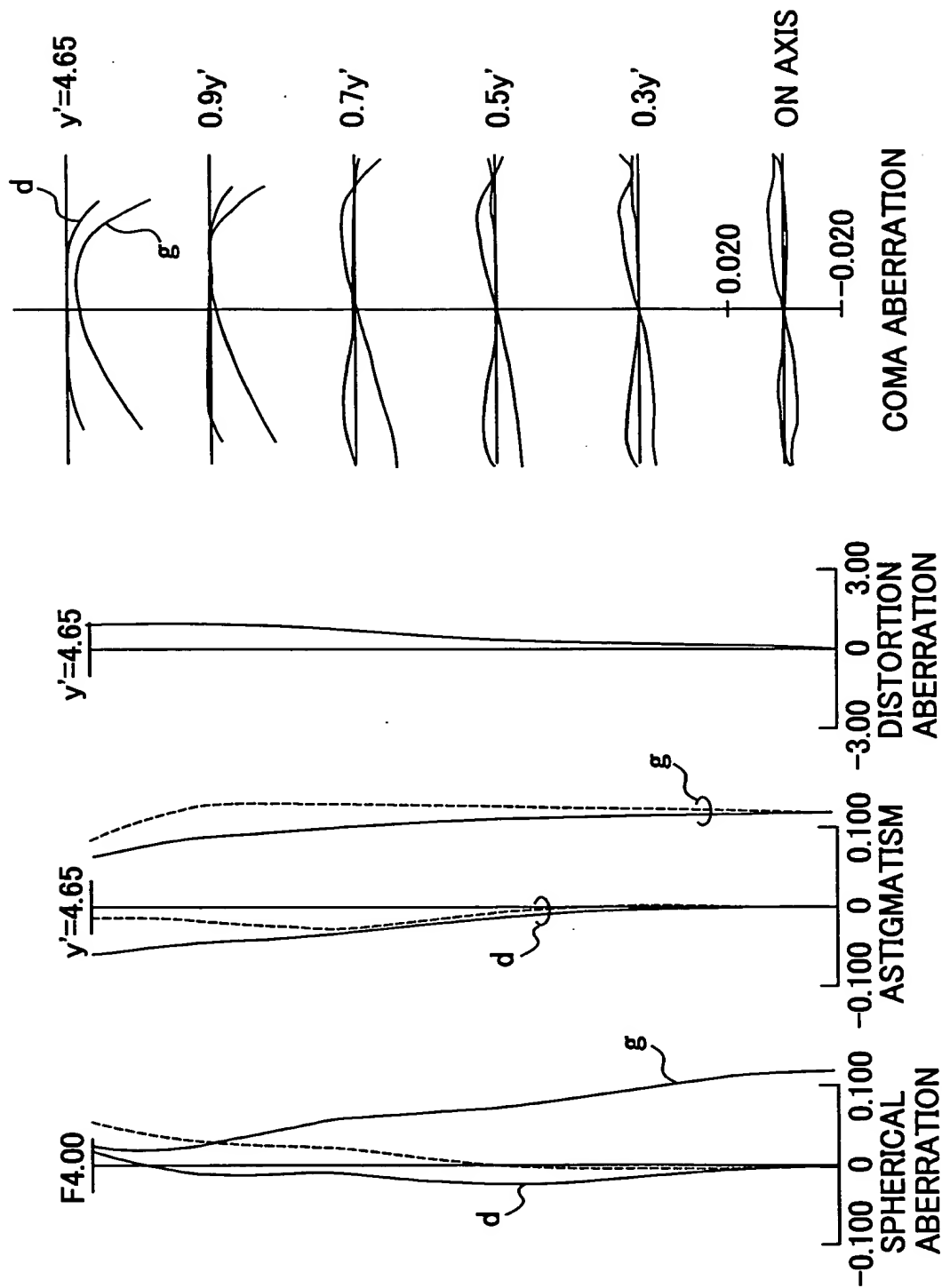


FIG. 29

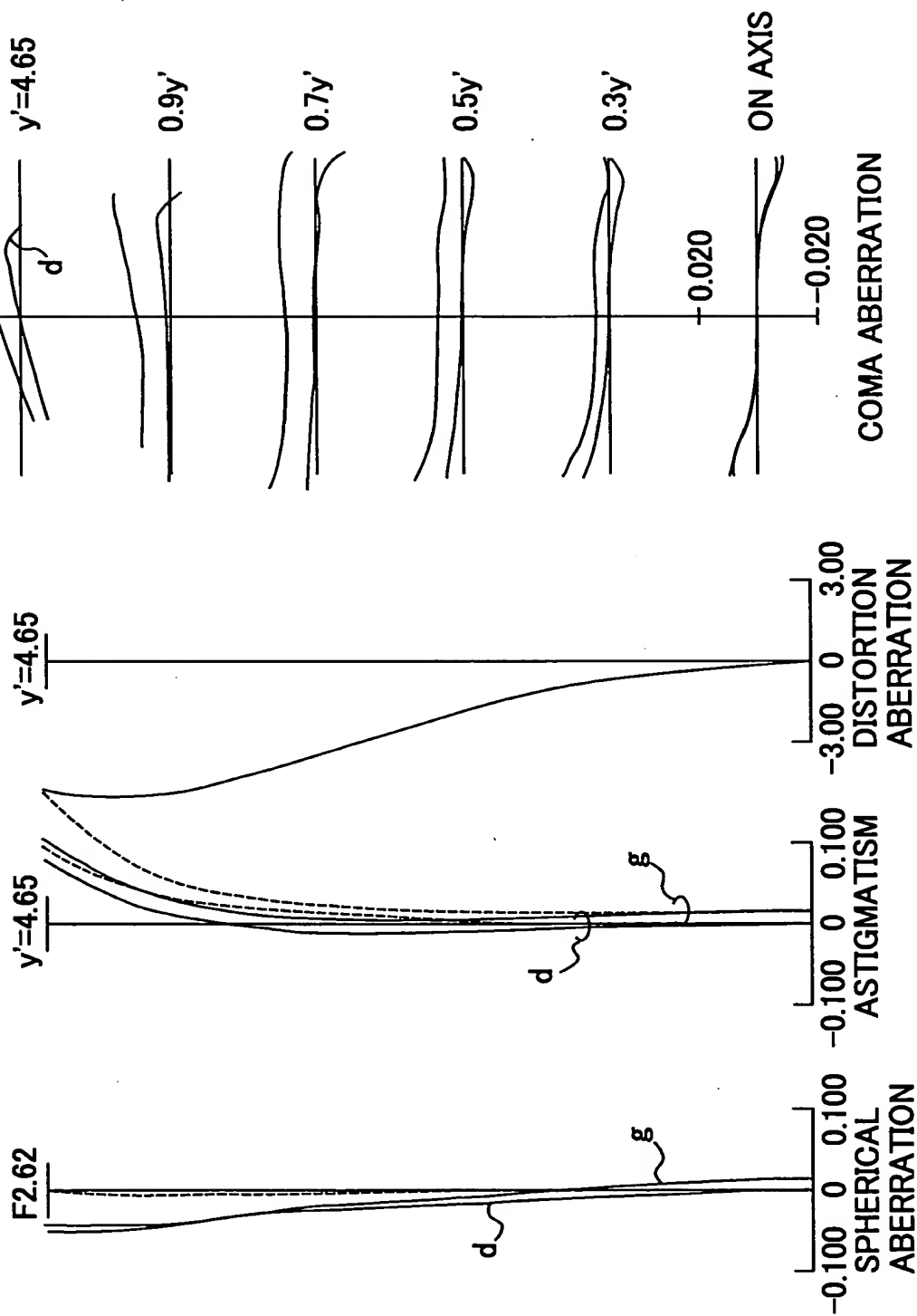


FIG. 30

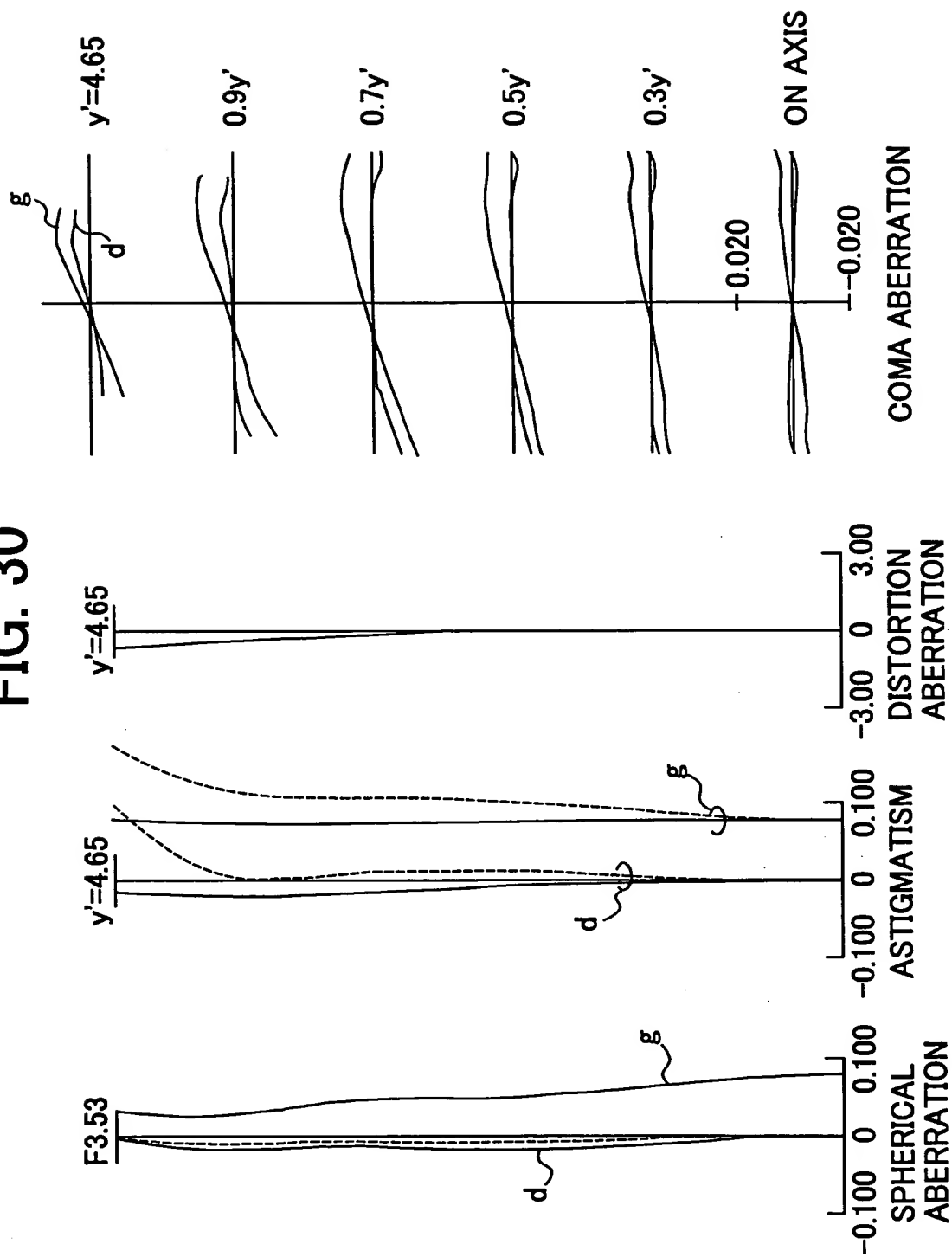


FIG. 31

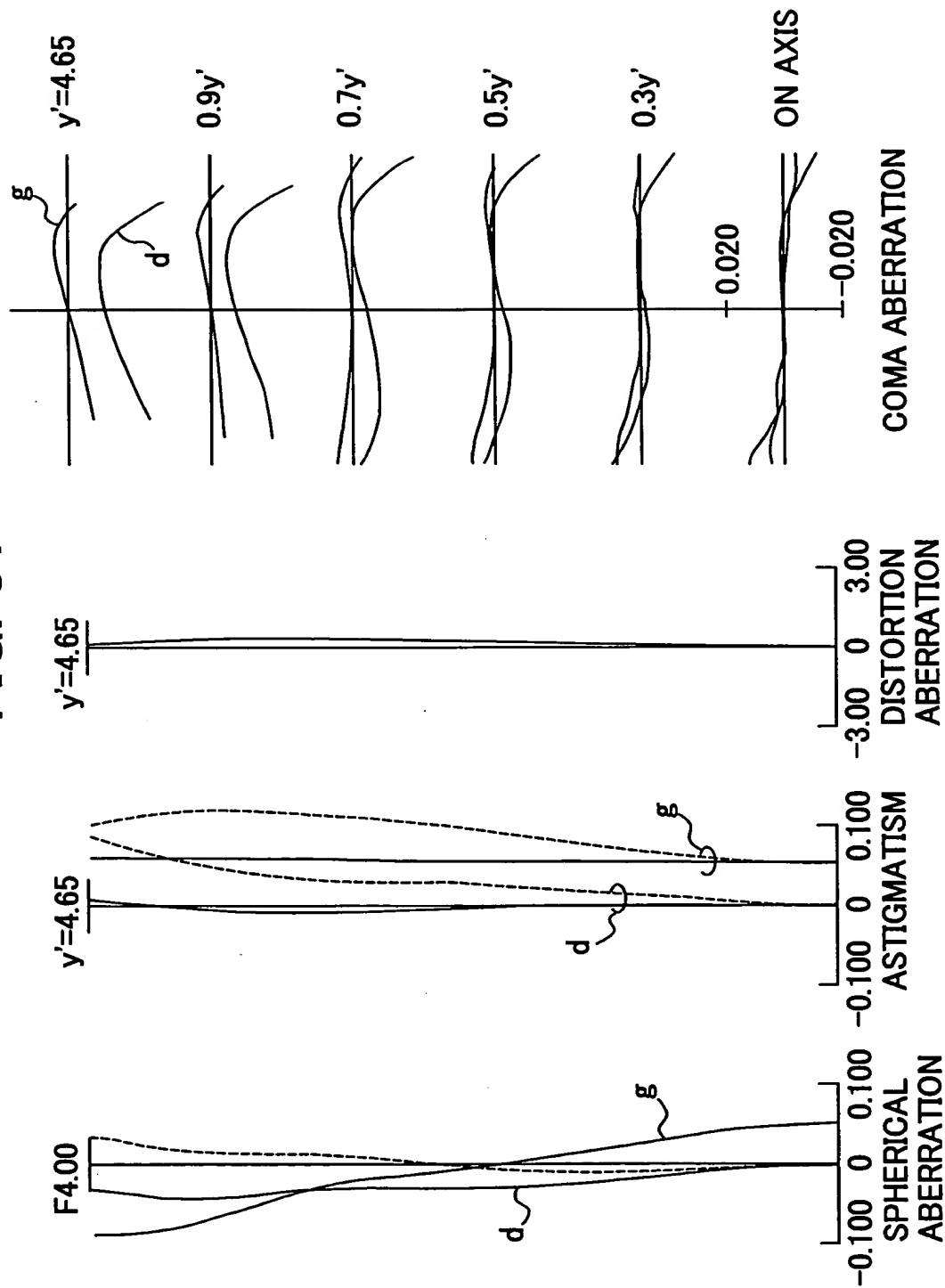


FIG. 32

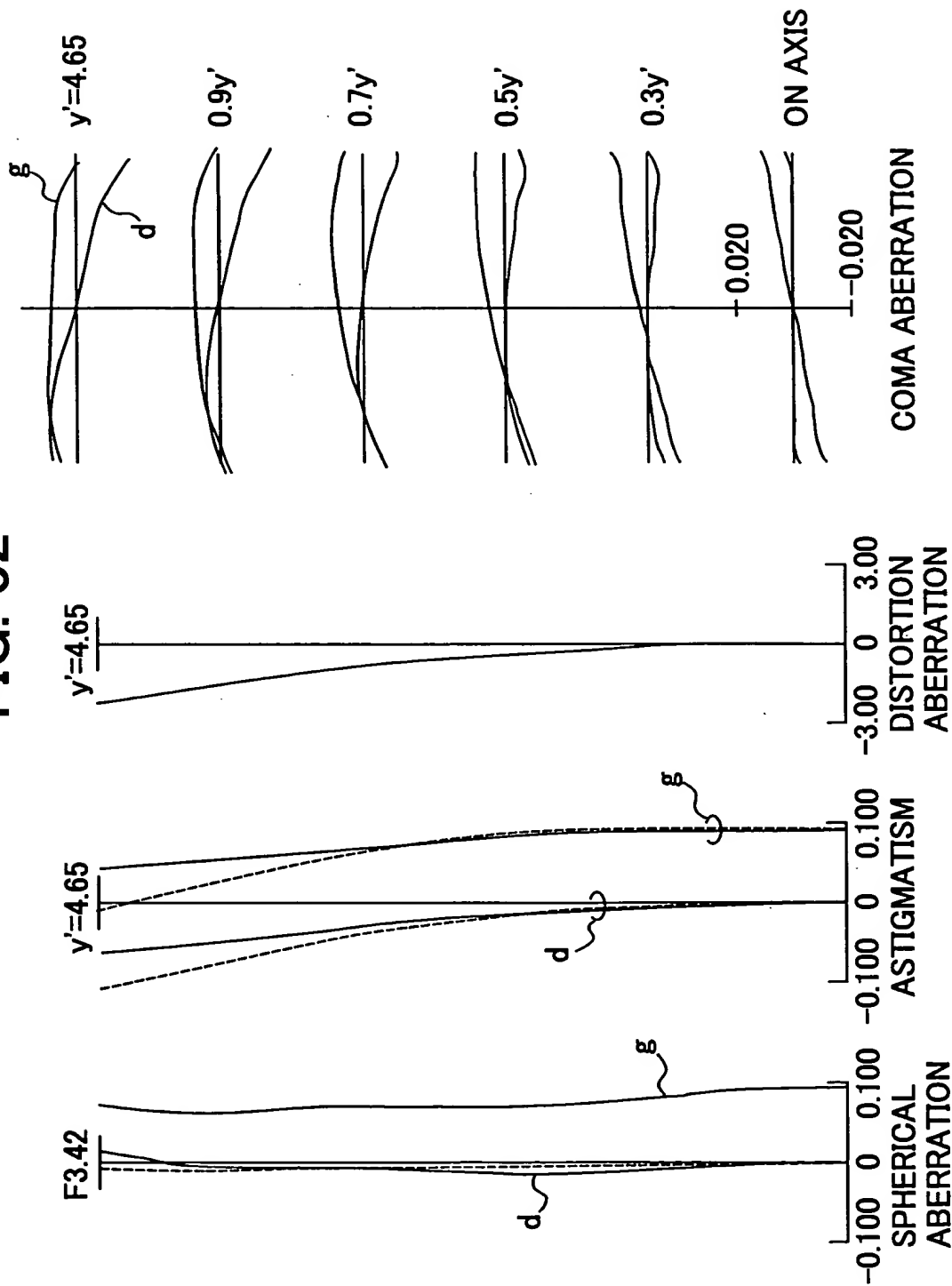


FIG. 33

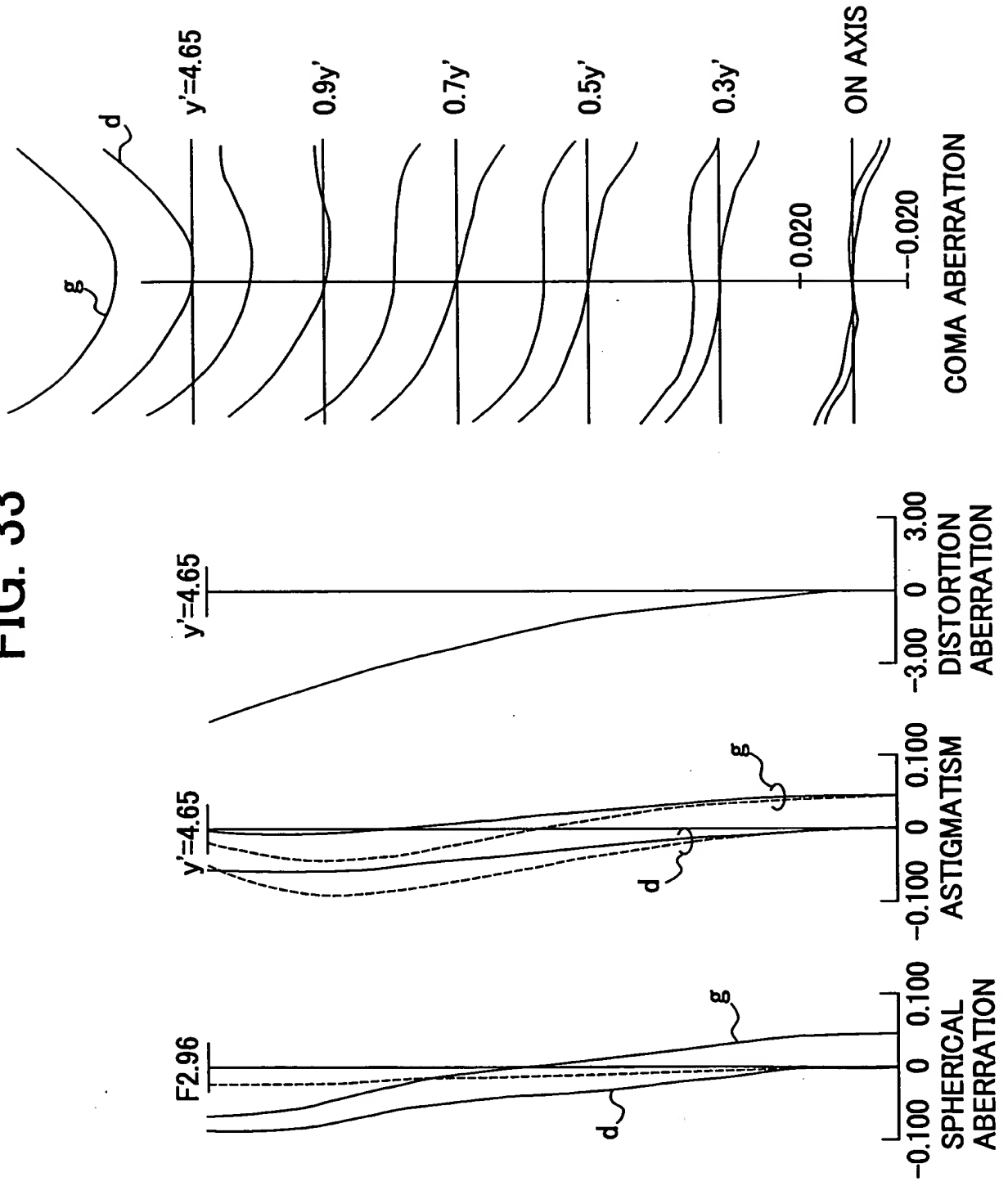


FIG. 34

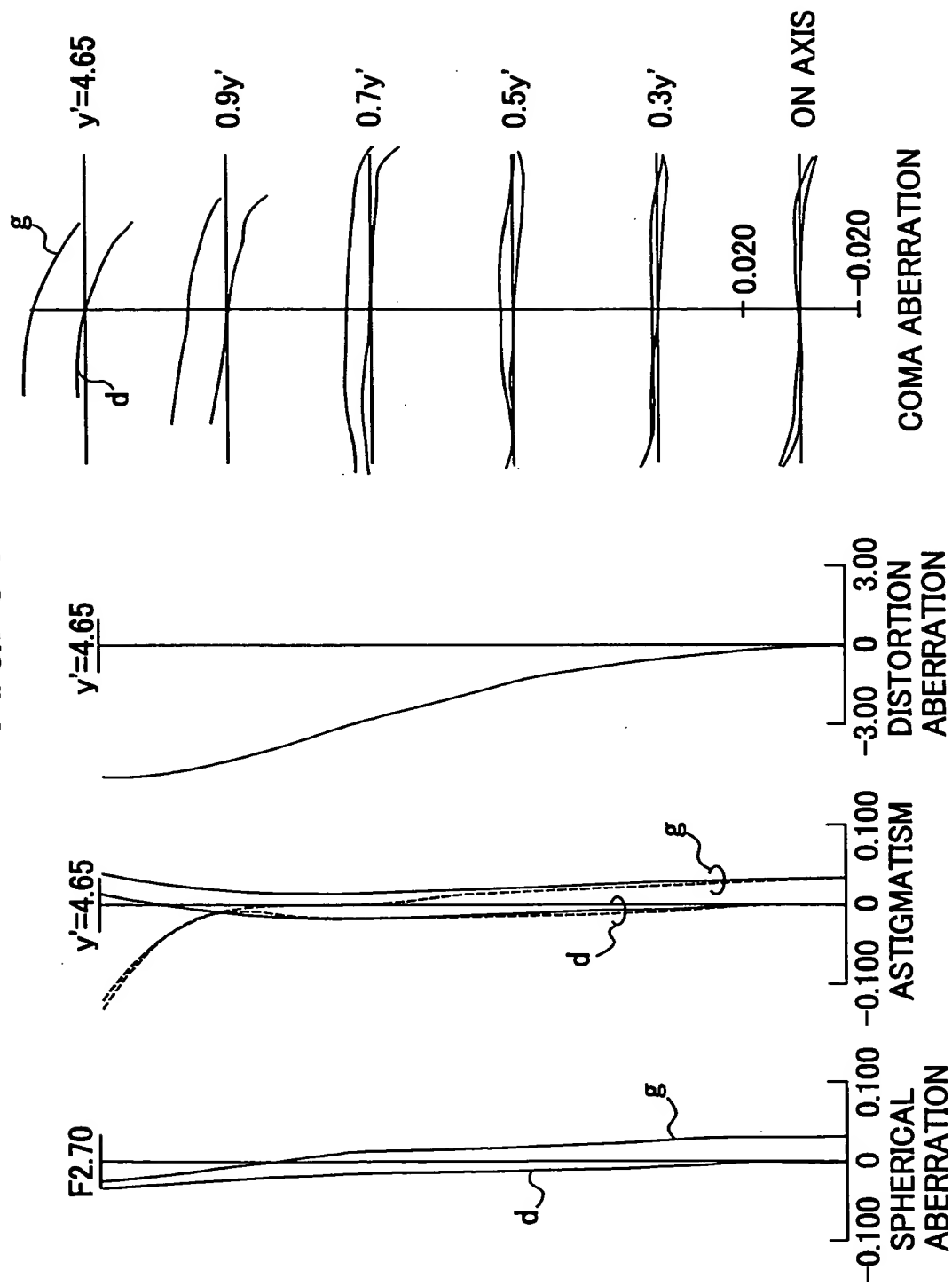


FIG. 35

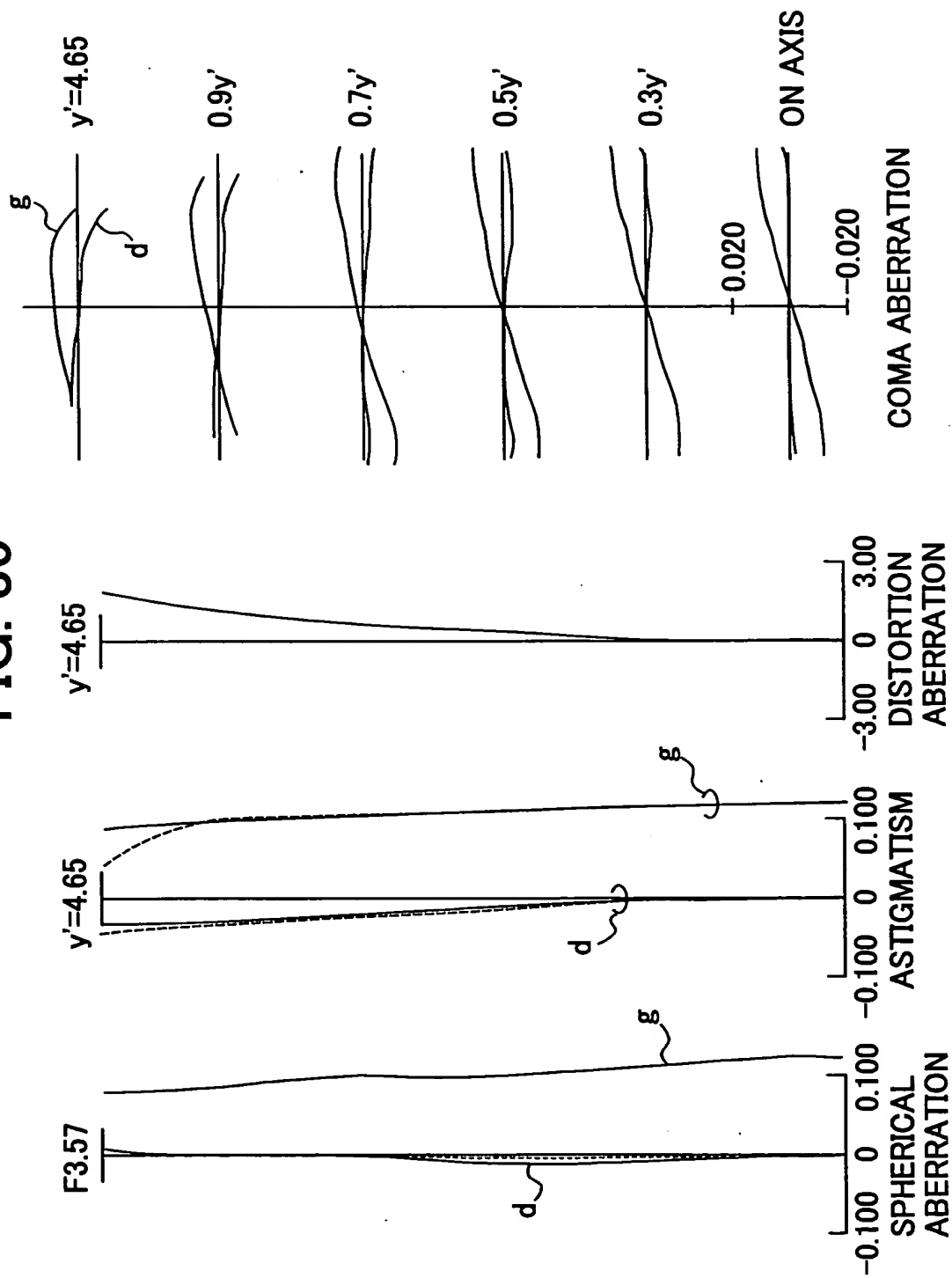
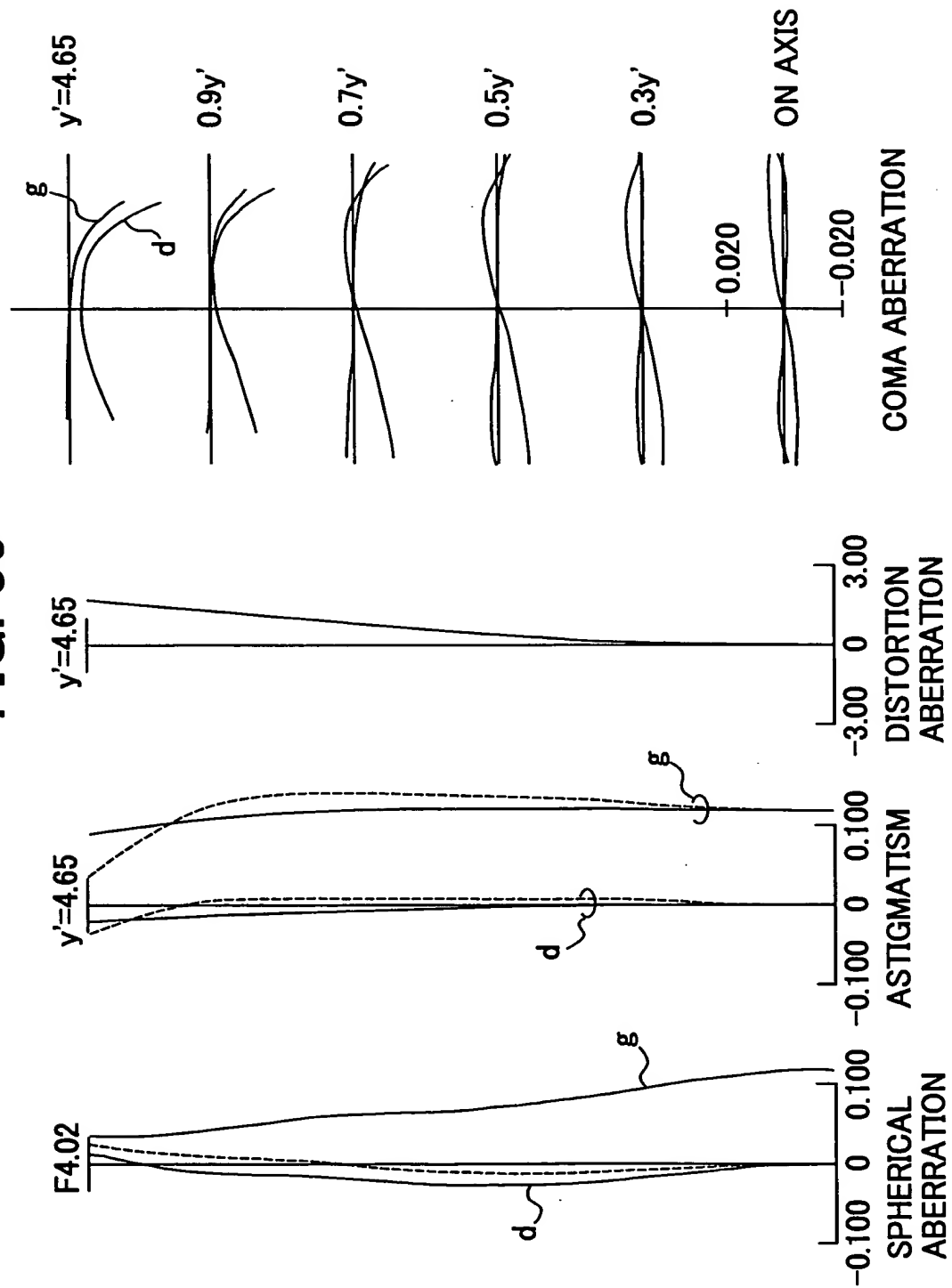


FIG. 36



COMA ABERRATION

ON AXIS

+0.020

-0.020

0.3y'

0.5y'

0.7y'

0.9y'

y'=4.65

g

d

FIG. 37

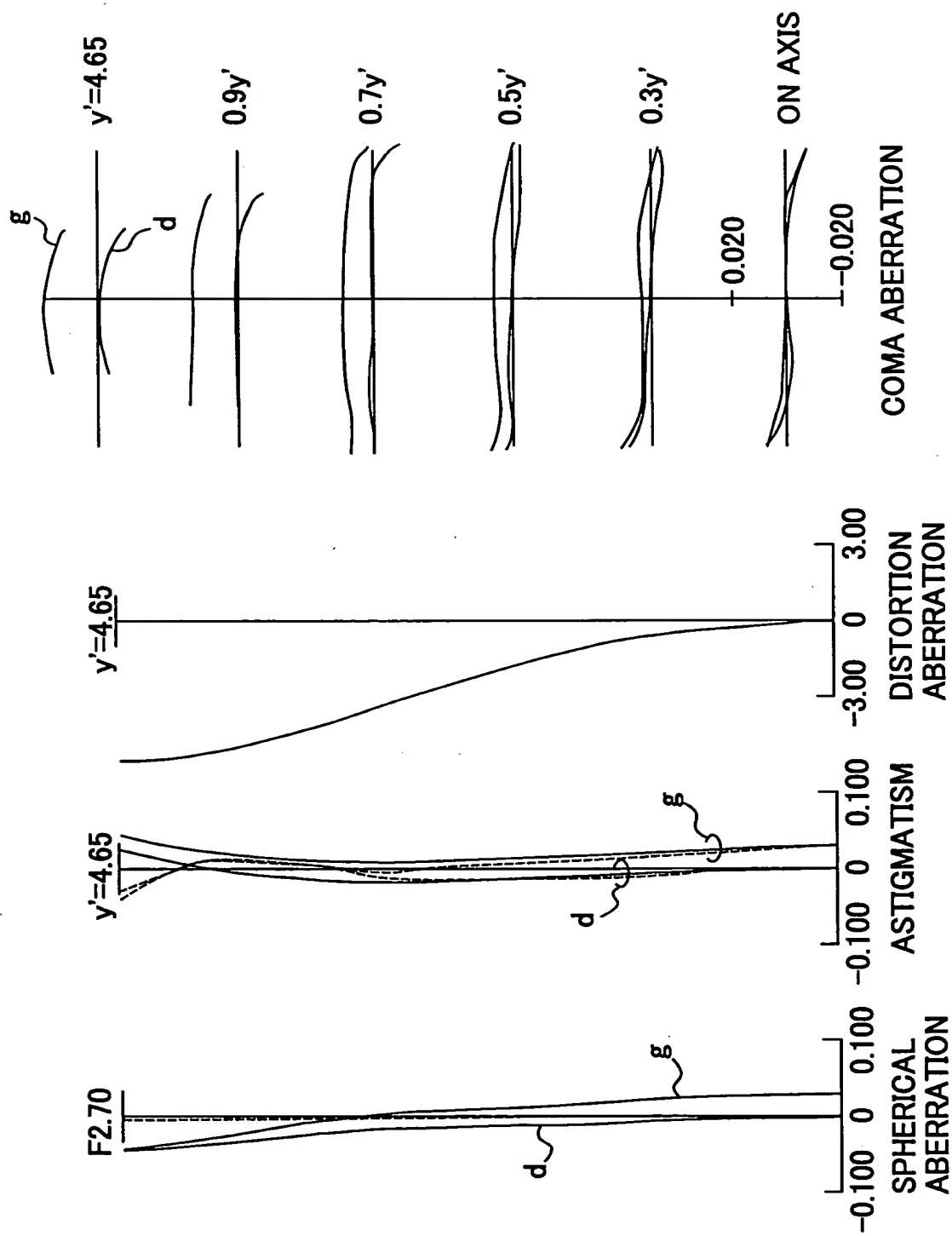


FIG. 38

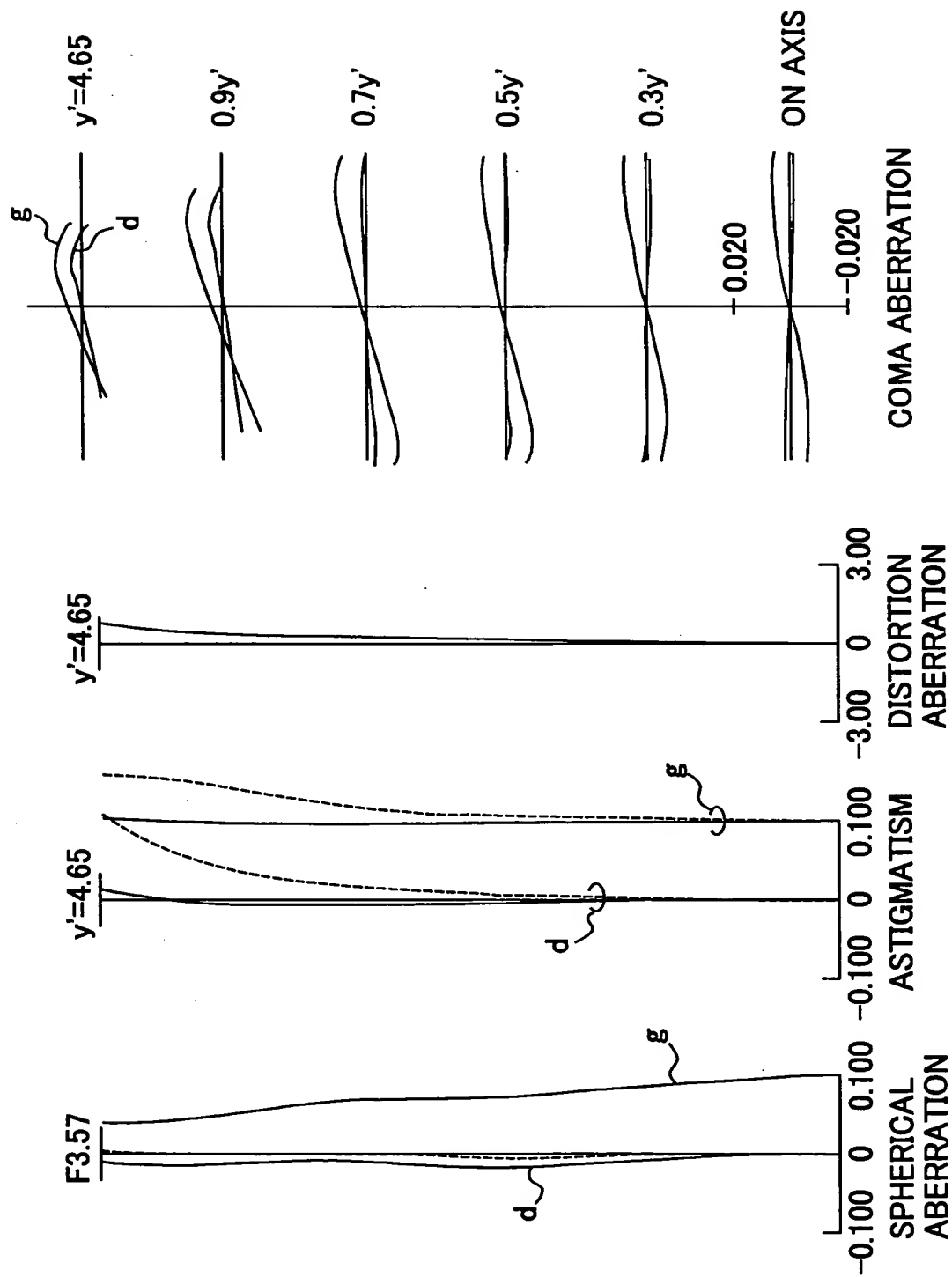


FIG. 39

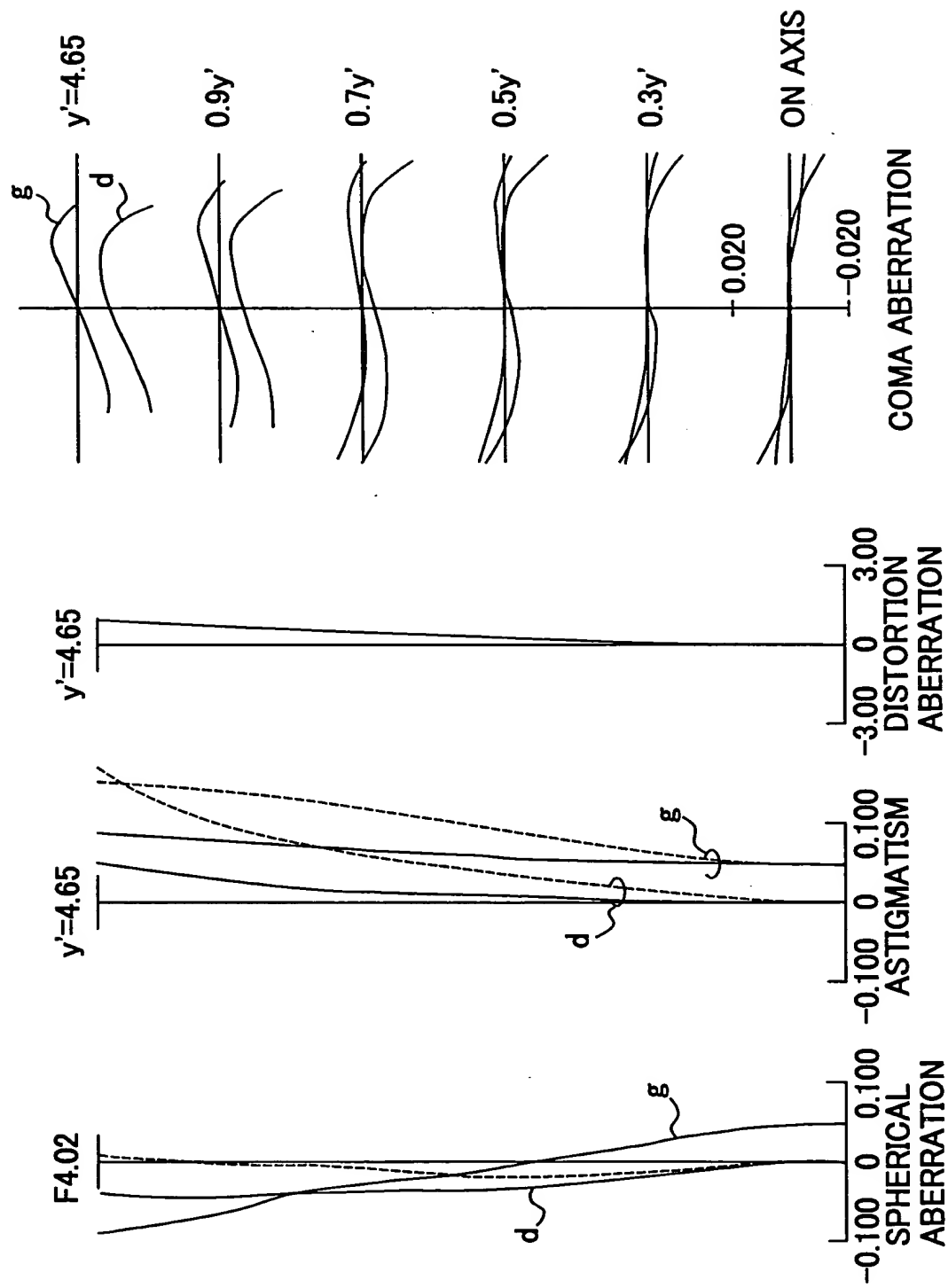


FIG. 40

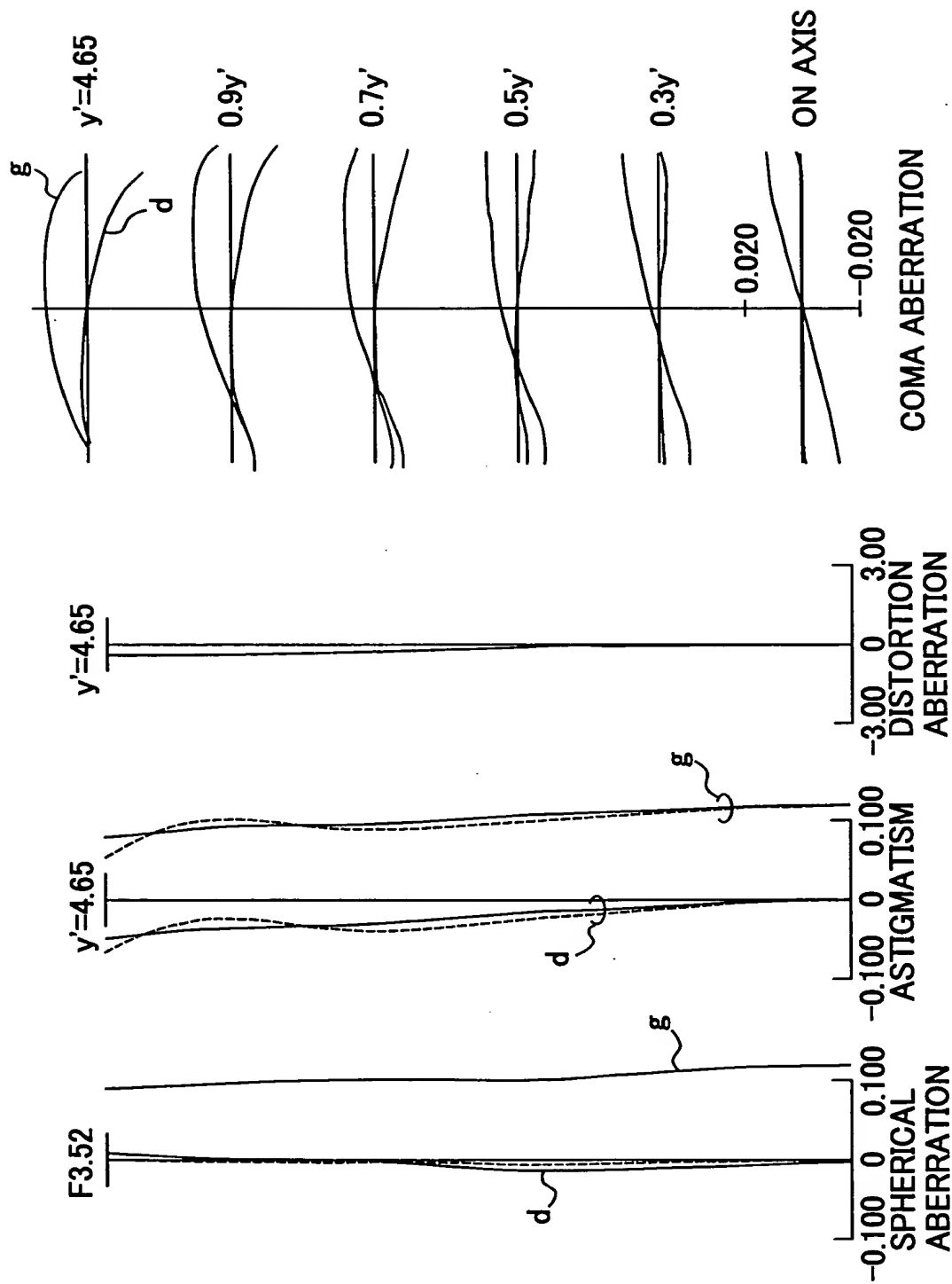


FIG. 41

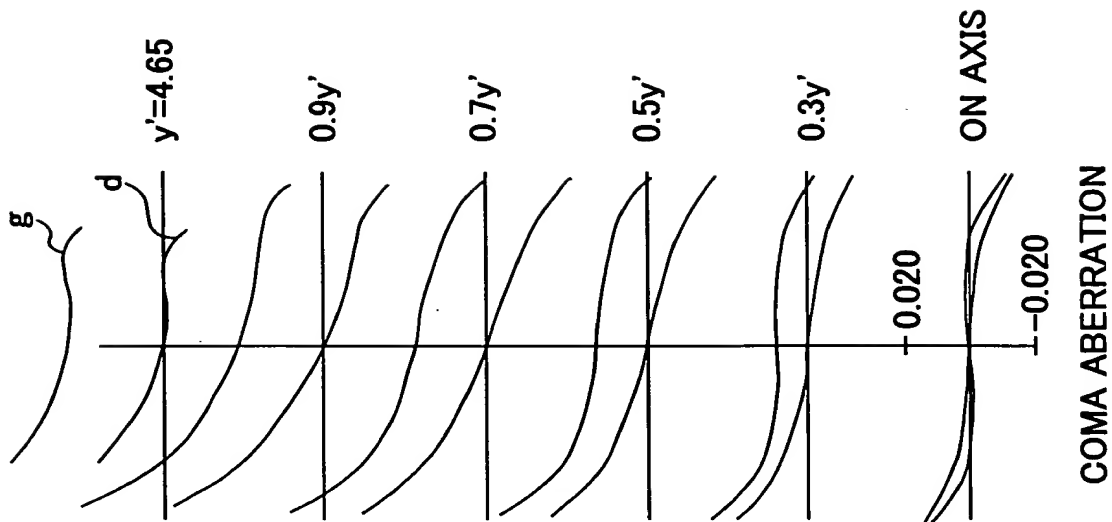
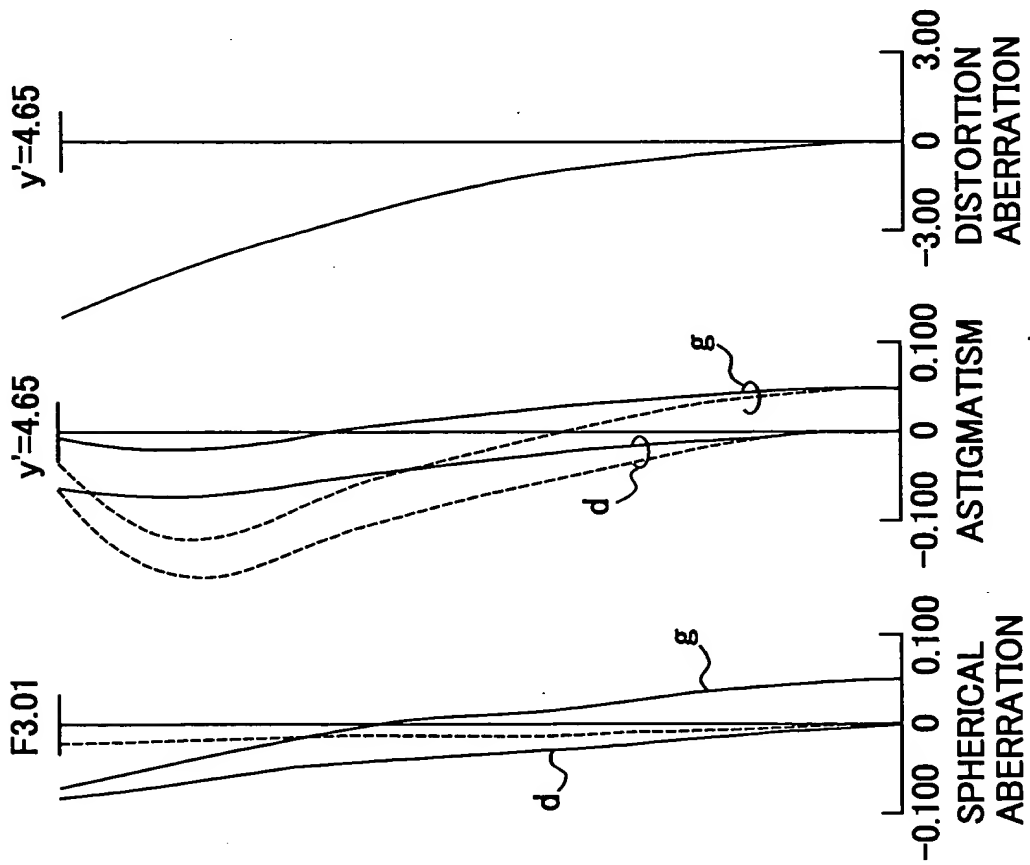


FIG. 42

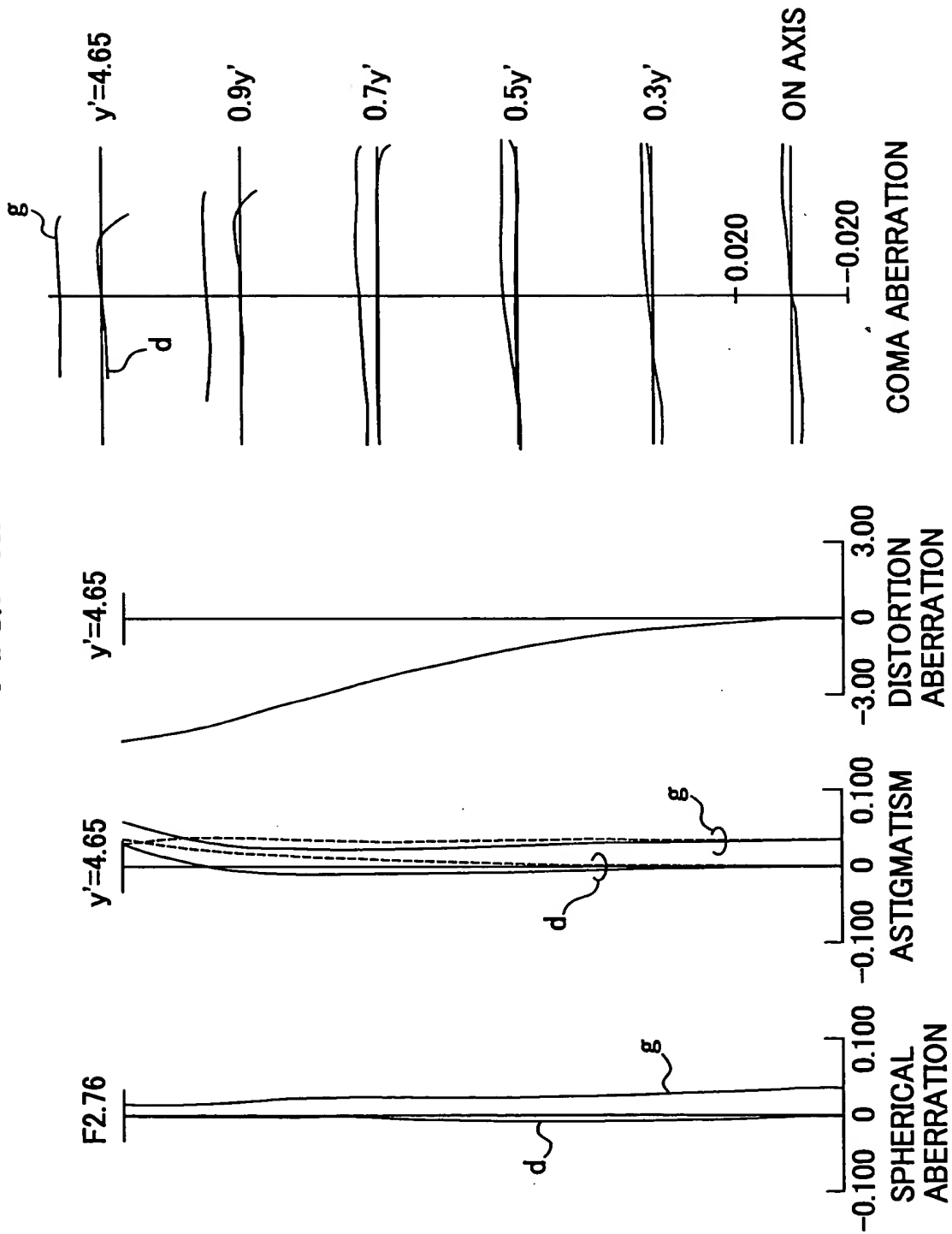


FIG. 43

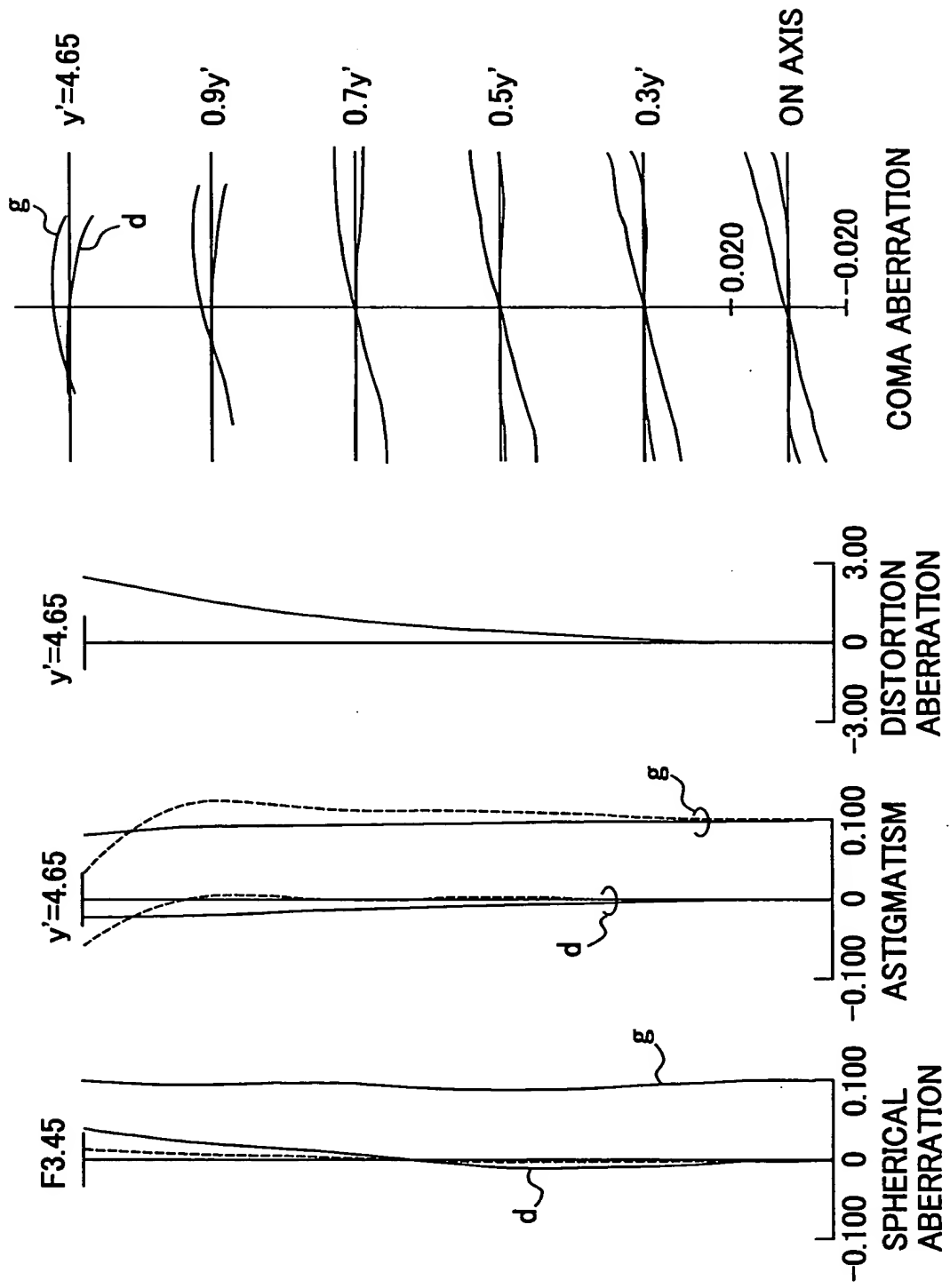


FIG. 44

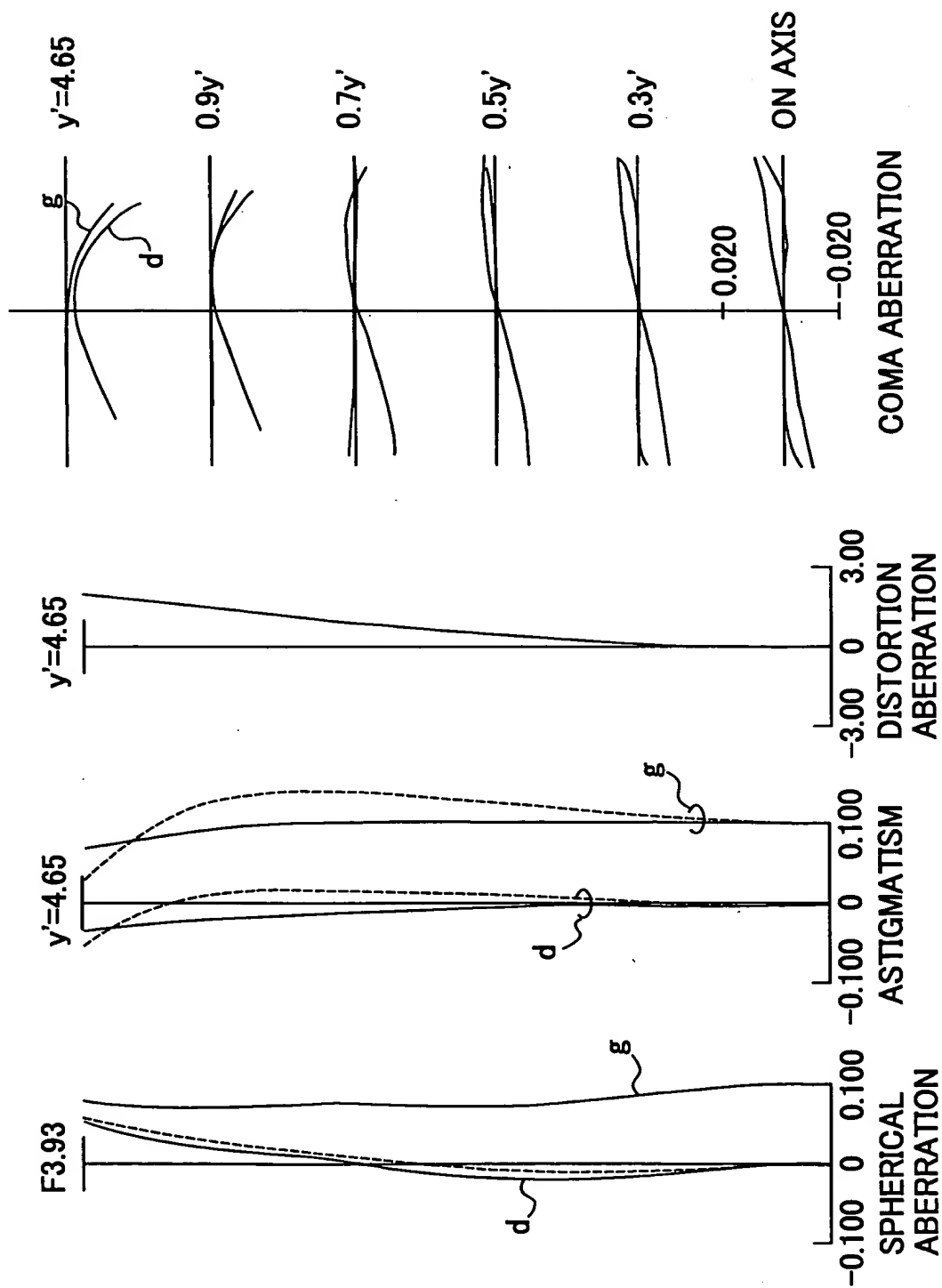


FIG. 45

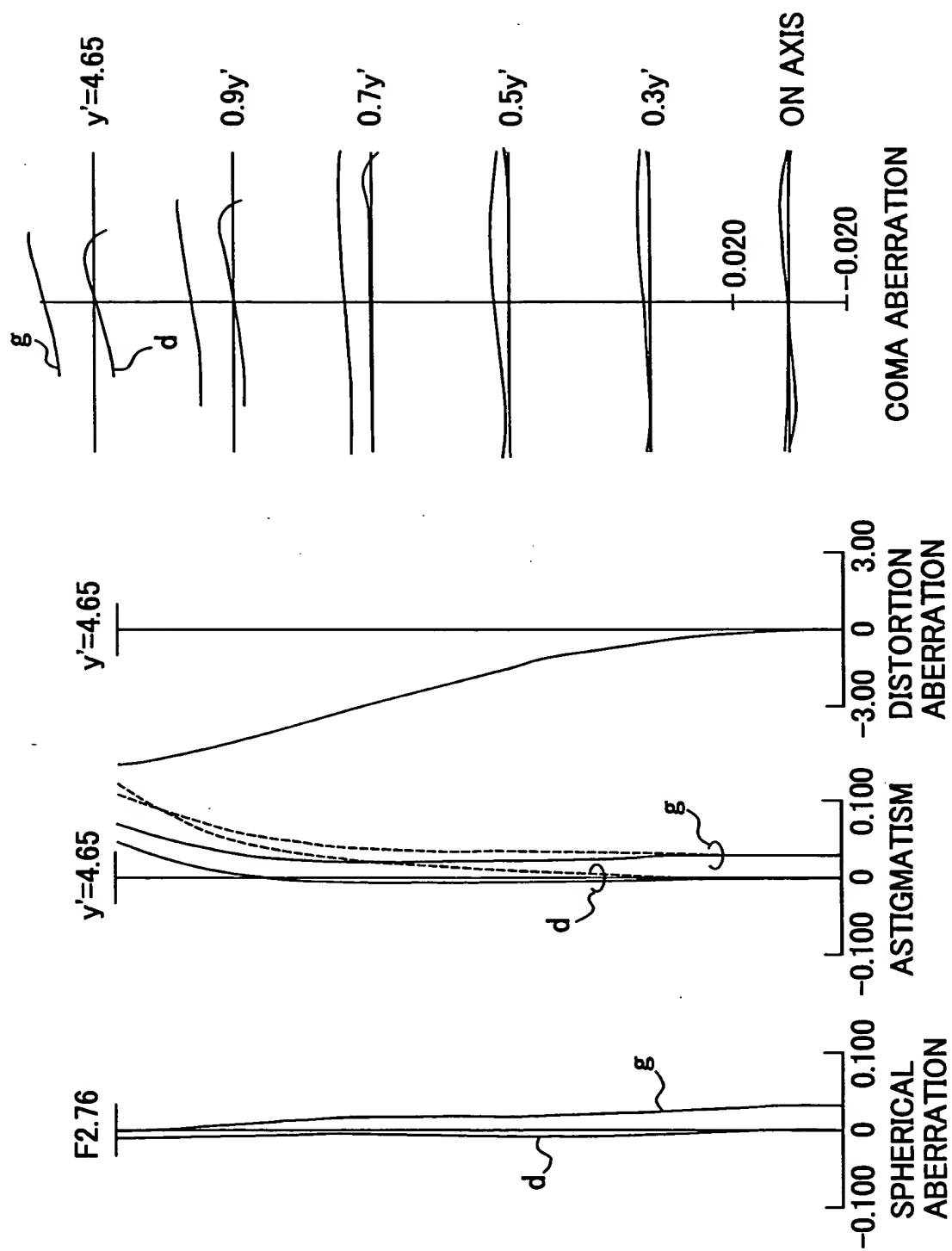


FIG. 46

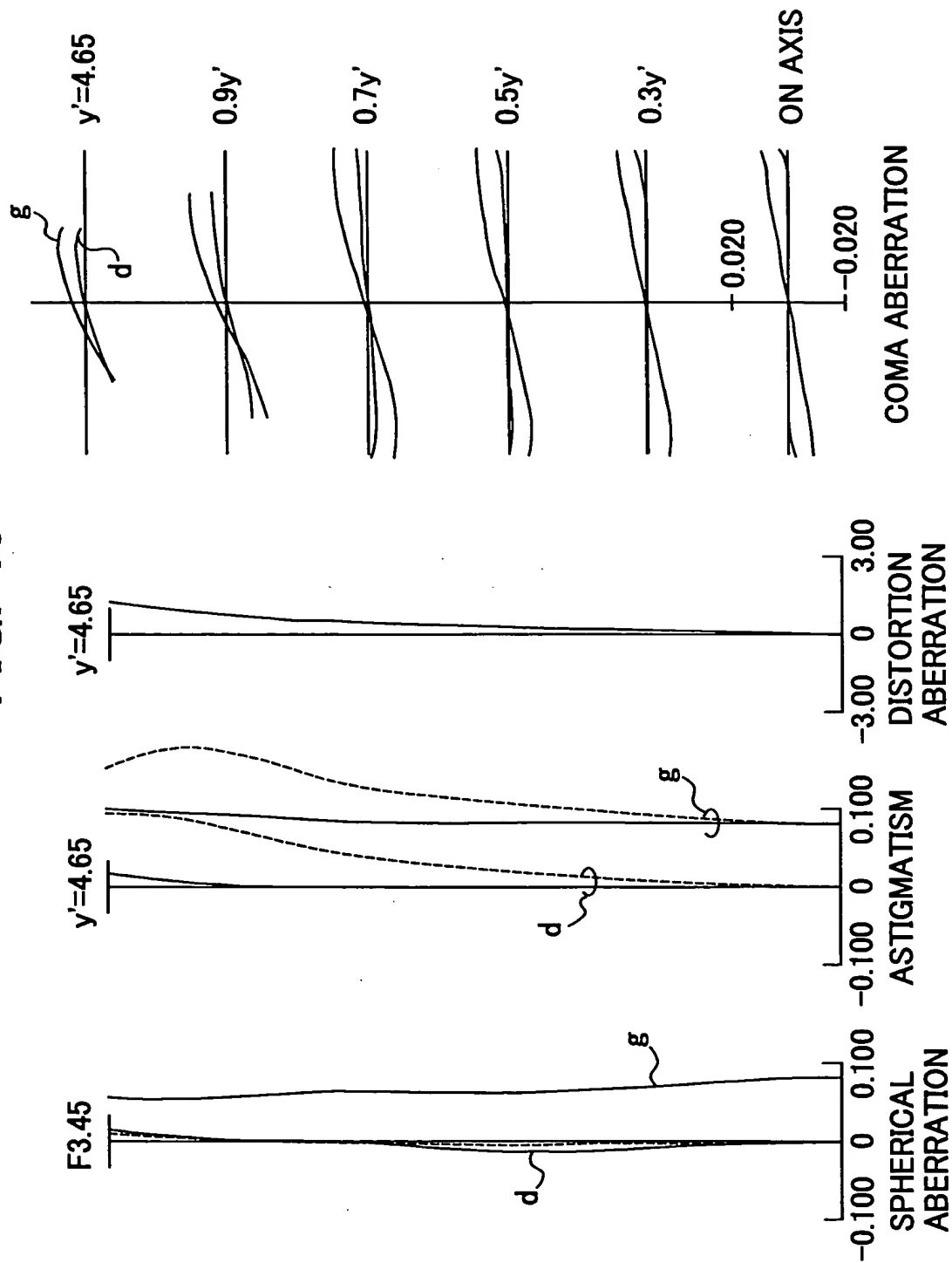


FIG. 47

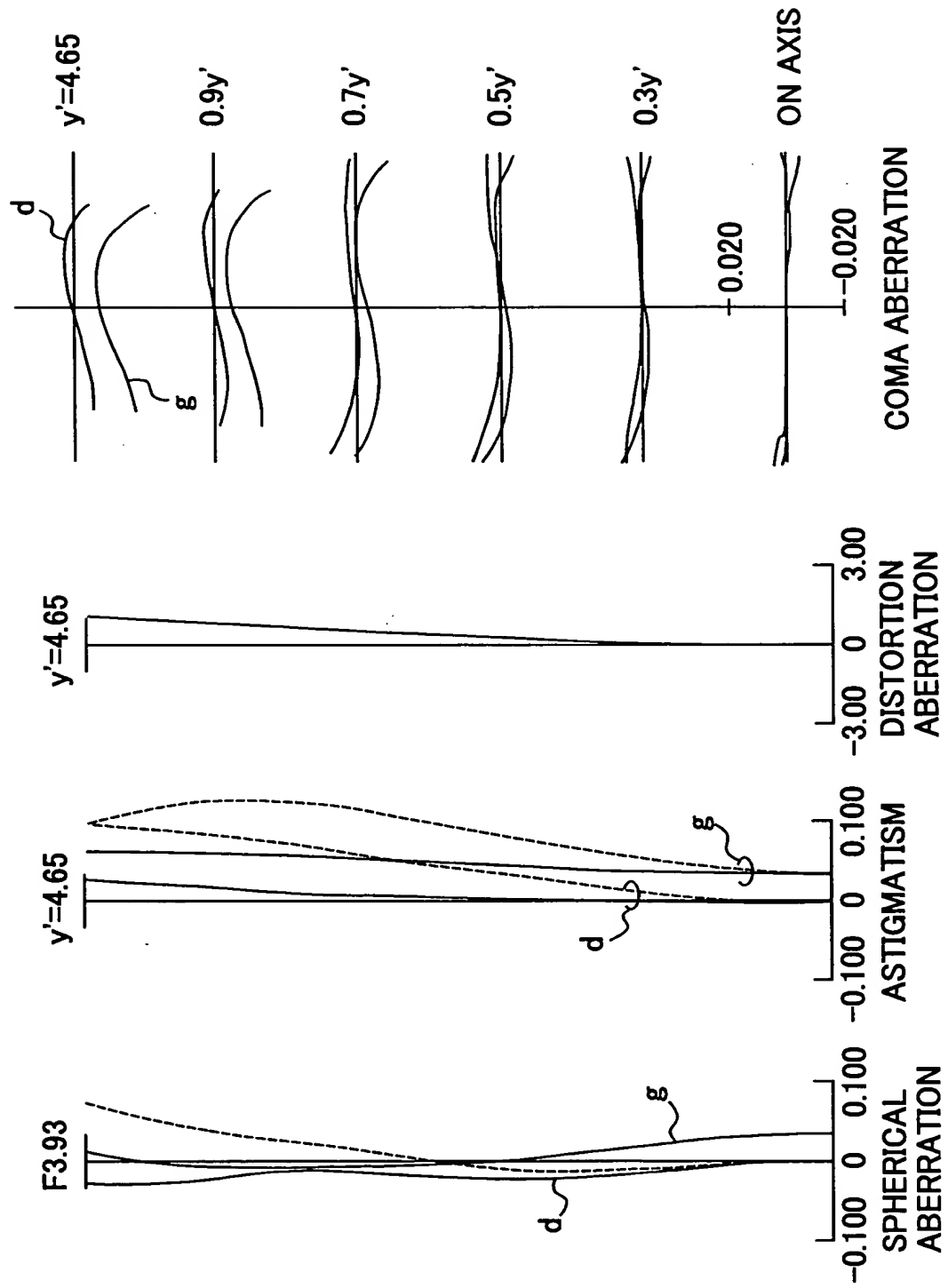


FIG. 48

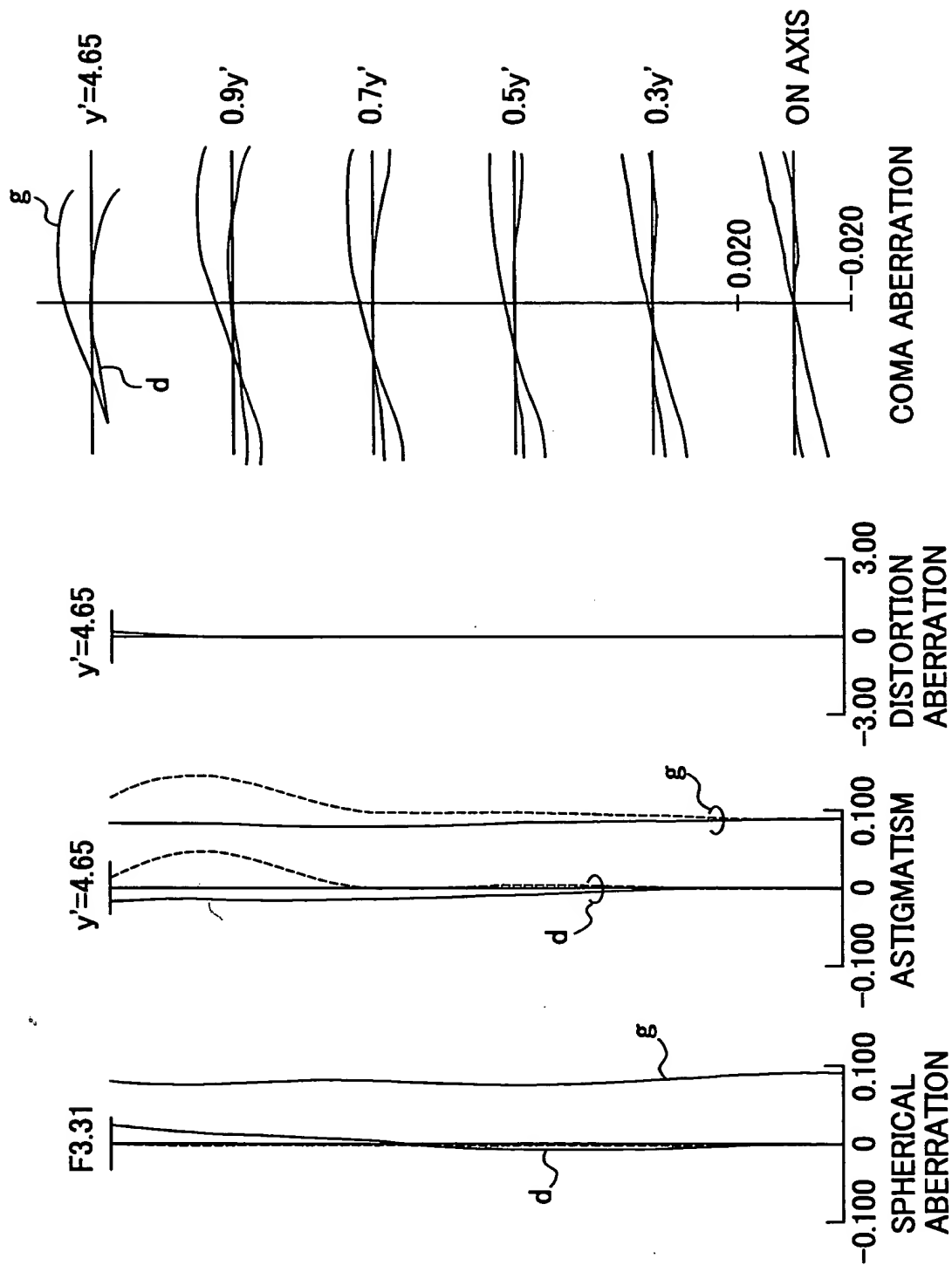


FIG. 49

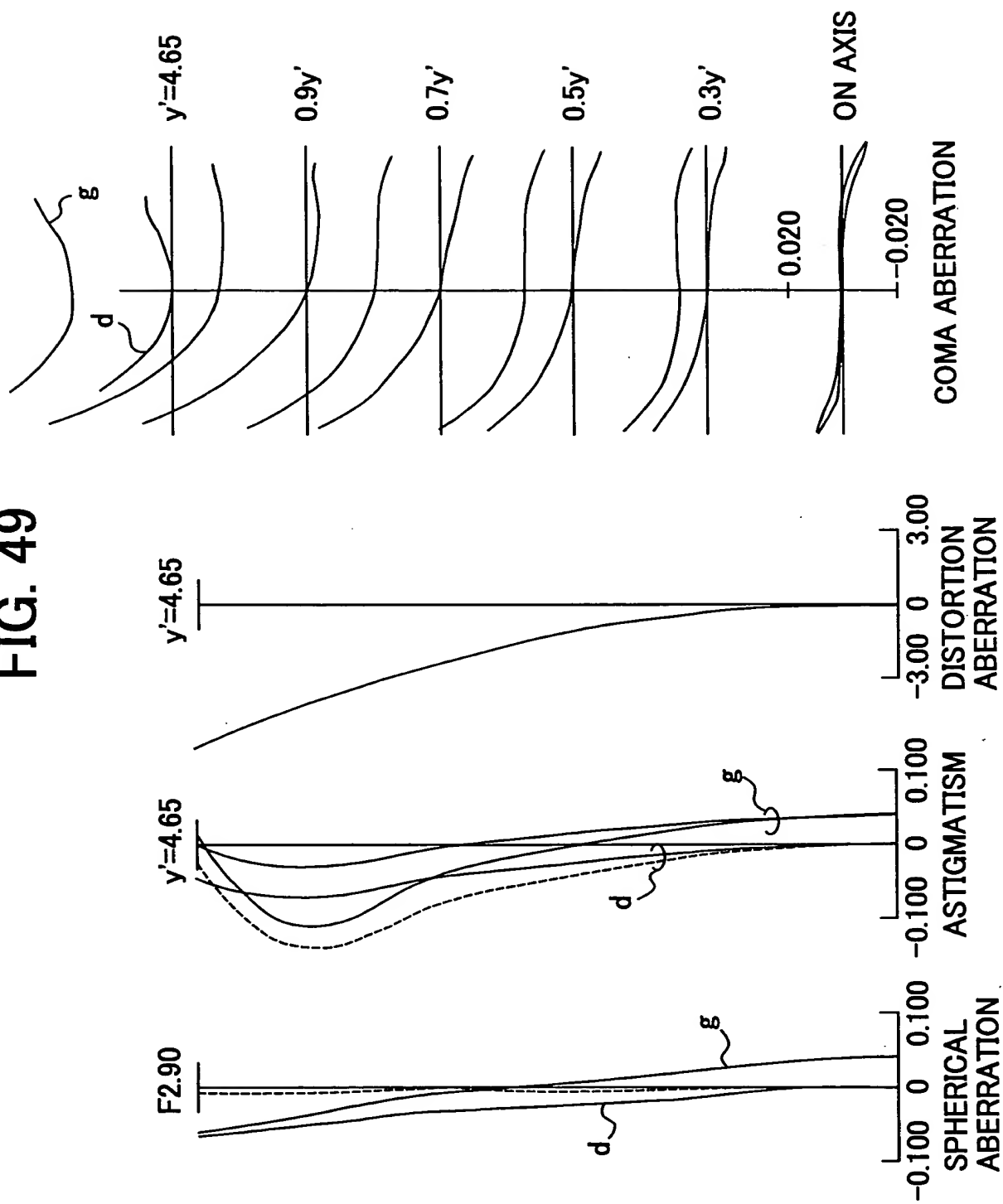


FIG. 50A

TABLE 1A

$f=7.52 \sim 35.41$, $F=2.78 \sim 4.02$, $\omega=32.88 \sim 7.35$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	26.655	1.20	1.84666	23.78	1st LENS
02	15.449	0.86			
03	16.227	4.67	1.77250	49.62	2nd LENS
04	-690.022	▲A			
05*	-40.171	1.00	1.77250	49.62	3rd LENS
06	11.901	2.28			
07*	-90.809	0.80	1.77250	49.62	4th LENS
08	11.495	0.10			
09	11.044	2.13	1.84666	23.78	5th LENS
10	62.549	▲B			
11	DIAPHRAGM	0.50			
12*	9.691	1.20	1.48749	70.44	6th LENS
13	16.569	▲C			
14*	16.186	2.04	1.62299	58.12	7th LENS
15	-21.031	0.10			
16	12.470	1.84	1.71300	53.94	8th LENS
17	-582.751	4.37	1.80518	25.46	9th LENS
18	6.332	▲D			
19*	12.416	2.11	1.58913	61.25	10th LENS
20	181.185	OPTION			
21	∞	3.332	1.51680	64.20	VARIETY OF FILTERS
22	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

FIG. 50B

TABLE 1B

NON-SPHERICAL SURFACE OF 5th SURFACE K=0.0, $A_4=5.33251 \times 10^{-5}$ $A_6=1.60356 \times 10^{-6}$ $A_8=-1.65292 \times 10^{-8}$ $A_{10}=9.523698 \times 10^{-11}$
NON-SPHERICAL SURFACE OF 7th SURFACE K=-5.00470, $A_4=-2.37368 \times 10^{-5}$ $A_6=-2.56706 \times 10^{-6}$ $A_8=-2.81710 \times 10^{-8}$ $A_{10}=1.37805 \times 10^{-11}$
NON-SPHERICAL SURFACE OF 12th SURFACE K=-1.96407, $A_4=1.55199 \times 10^{-4}$ $A_6=-6.14819 \times 10^{-6}$ $A_8=5.61905 \times 10^{-7}$ $A_{10}=-2.19665 \times 10^{-8}$
NON-SPHERICAL SURFACE OF 14th SURFACE K=-2.41495, $A_4=-6.33751 \times 10^{-5}$ $A_6=1.38599 \times 10^{-6}$ $A_8=-8.42773 \times 10^{-8}$ $A_{10}=1.83313 \times 10^{-4}$
NON-SPHERICAL SURFACE OF 19th SURFACE K=0.0, $A_4=3.25504 \times 10^{-5}$ $A_6=-1.10948 \times 10^{-6}$ $A_8=9.67180 \times 10^{-8}$ $A_{10}=-1.28197 \times 10^{-9}$

TABLE 1C
VARIABLE INTERVAL

	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.32	LONG FOCAL POINT END f=35.41
A	1.000	8.525	14.979
B	15.595	8.070	1.616
C	8.078	4.388	1.500
D	3.854	7.544	10.432

TABLE 1D
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.47$
$(f_{12T}/f_1)=-1.090$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.537$

TABLE 1E
FOCAL LENGTH & VARIABLE INTERVALS WHEN MAGNIFICATION
FROM SHORT TO LONG FOCAL POINT ENDS IS PERFORMED AND
THE 4TH LENS BAND IS CLOSEST TO THE 3RD LENS BAND

f:32.861,	A:14.155,	B:2.440,	C:1.350,	D:10.582
-----------	-----------	----------	----------	----------

FIG. 51A

TABLE 2A

$f=7.52\sim 35.42$, $F=2.68\sim 4.02$, $\omega=32.96\sim 7.32$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	26.120	1.20	1.84666	23.78	1st LENS
02	15.408	0.73			
03	16.082	4.44	1.77250	49.62	2nd LENS
04	-2461.477	▲A			
05*	-53.574	1.00	1.80610	40.73	3rd LENS
06	11.021	2.33			
07*	-189.253	0.80	1.69350	53.34	4th LENS
08	9.727	0.11			
09	9.808	2.22	1.84666	23.78	5th LENS
10	43.589	▲B			
11	DIAPHRAGM	0.50			
12*	10.080	1.19	1.48749	70.44	6th LENS
13	17.824	▲C			
14*	14.261	2.45	1.58913	61.25	7th LENS
15	-21.061	0.10			
16	11.627	2.45	1.70514	41.15	8th LENS
17	-33.441	2.88	1.80518	25.46	9th LENS
18	6.497	▲D			
19*	10.344	1.98	1.58913	61.25	10th LENS
20	33.975	OPTION			
21	∞	3.332	1.51680	64.20	VARIETY OF FILTERS
22	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

FIG. 51B

TABLE 2B

<p>NON-SPHERICAL SURFACE OF 5th SURFACE $K=0.0$, $A_4=3.77213 \times 10^{-5}$, $A_6=1.03690 \times 10^{-6}$, $A_8=1.11273 \times 10^{-8}$ $A_{10}=6.33905 \times 10^{-11}$</p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE $K=0.0$, $A_4=9.35662 \times 10^{-6}$, $A_6=-2.41906 \times 10^{-6}$, $A_8=5.93970 \times 10^{-9}$ $A_{10}=-3.64847 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE $K=-2.14178$, $A_4=1.44251 \times 10^{-4}$, $A_6=-4.77086 \times 10^{-6}$, $A_8=4.23771 \times 10^{-7}$ $A_{10}=-1.74996 \times 10^{-8}$</p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE $K=-1.75847$, $A_4=-4.69337 \times 10^{-5}$, $A_6=5.28273 \times 10^{-7}$, $A_8=-2.09994 \times 10^{-8}$ $A_{10}=3.06349 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 19th SURFACE $K=0.0$, $A_4=-3.92832 \times 10^{-5}$, $A_6=-4.61773 \times 10^{-7}$, $A_8=8.17517 \times 10^{-6}$ $A_{10}=-1.25985 \times 10^{-9}$</p>

TABLE 2C
VARIABLE INTERVAL

	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$
A	1.000	8.620	14.603
B	15.257	7.636	1.654
C	8.946	5.131	1.500
D	3.196	7.057	11.587

TABLE 2D
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.55$
$(f_{12T}/f_1)=-1.086$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.523$

FIG. 51B

FIG. 52A

TABLE 3A

$f=7.52 \sim 42.48$, $F=2.38 \sim 4.00$, $\omega=33.10 \sim 6.12$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	31.036	1.02	1.84666	23.78	1st LENS
02	17.869	1.41			
03	19.260	4.17	1.77250	49.62	2nd LENS
04	-267.057	▲A			
05*	-43.607	1.00	1.83500	42.98	3rd LENS
06	11.134	2.45			
07*	-378.543	0.80	1.74330	49.22	4th LENS
08	14.455	0.10			
09	13.436	2.30	1.84666	23.78	5th LENS
10	339.694	▲B			
11	DIAPHRAGM	0.50			
12*	11.208	1.21	1.48749	70.44	6th LENS
13	17.548	▲C			
14*	16.335	2.80	1.62299	58.12	7th LENS
15	-30.357	0.10			
16	16.543	3.24	1.77250	49.62	8th LENS
17	-17.522	2.43	1.71736	29.50	9th LENS
18	7.459	▲D			
19*	9.682	2.25	1.48749	70.44	10th LENS
20	30.238	OPTION			
21	∞	3.332	1.51680	64.20	VARIETY OF FILTERS
22	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

050535Z

TABLE 3B

<p>NON-SPHERICAL SURFACE OF 5th SURFACE</p> <p>$K=0.0$, $A_4=5.12563 \times 10^{-5}$, $A_6=1.60220 \times 10^{-7}$, $A_8=6.03181 \times 10^{-11}$</p> <p>$A_{10}=-5.54096 \times 10^{-12}$</p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE</p> <p>$K=-2372.29$, $A_4=8.29144 \times 10^{-6}$, $A_6=-3.62960 \times 10^{-7}$, $A_8=-1.18221 \times 10^{-8}$</p> <p>$A_{10}=-6.64935 \times 10^{-11}$</p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE</p> <p>$K=-2.54795$, $A_4=1.30168 \times 10^{-4}$, $A_6=-9.63887 \times 10^{-7}$, $A_8=7.57566 \times 10^{-9}$</p> <p>$A_{10}=-2.29717 \times 10^{-11}$</p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE</p> <p>$K=-1.25642$, $A_4=-4.03456 \times 10^{-5}$, $A_6=4.01824 \times 10^{-8}$, $A_8=-1.74724 \times 10^{-9}$</p> <p>$A_{10}=1.17398 \times 10^{-11}$</p>
<p>NON-SPHERICAL SURFACE OF 19th SURFACE</p> <p>$K=0.0$, $A_4=-4.24707 \times 10^{-5}$, $A_6=5.03298 \times 10^{-7}$, $A_8=2.74980 \times 10^{-9}$</p> <p>$A_{10}=3.15192 \times 10^{-11}$</p>

TABLE 3C
VARIABLE INTERVAL

	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=17.88	LONG FOCAL POINT END f=42.48
A	1.000	10.341	17.787
B	18.311	8.970	1.524
C	12.515	6.527	1.500
D	3.171	10.194	16.950

TABLE 3D
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.66$
$(f_{12T}/f_1)=-1.144$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.465$

FIG. 53A

TABLE 4A

$f=7.52 \sim 35.42$, $F=2.62 \sim 4.00$, $\omega=32.99 \sim 7.41$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	26.529	1.20	1.84666	23.78	1st LENS
02	15.607	1.17			
03	16.702	4.36	1.77250	49.62	2nd LENS
04	-371.916	▲A			
05*	-29.404	1.00	1.80610	40.73	3rd LENS
06	8.571	2.20			
07	32.023	0.80	1.54072	47.20	4th LENS
08	8.557	2.49	1.84666	23.78	5th LENS
09	30.960	▲B			
10	DIAPHRAGM	0.50			
11*	7.674	1.10	1.58913	61.25	6th LENS
12	8.158	▲C			
13*	10.021	2.54	1.58913	61.25	7th LENS
14*	-63.691	0.10			
15	15.867	2.15	1.48749	70.44	8th LENS
16	-50.882	0.10			
17	12.522	1.82	1.59913	61.25	9th LENS
18	76.837	0.80	1.80518	25.46	10th LENS
19	5.641	▲D			
20	18.992	3.37	1.60342	38.01	11th LENS
21*	-47.165	OPTION			
22	∞	3.214	1.51680	64.20	VARIETY OF FILTERS
23	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

SECRET

SECRET

SECRET

SECRET

SECRET

SECRET

SECRET

FIG. 54A

TABLE 5A

$f=7.52 \sim 35.42$, $F=2.70 \sim 4.02$, $\omega=33.09 \sim 7.35$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	39.389	1.20	1.84666	23.78	1st LENS
02	20.025	3.88			
03	158.989	0.10	1.53172	48.84	2nd LENS
04	26.736	2.70	1.77250	49.62	3rd LENS
05	578.390	▲A			
06*	-71.421	1.00	1.80610	40.73	4th LENS
07*	8.802	3.05			
08	-16.232	0.80	1.51742	52.15	5th LENS
09	11.846	2.06	1.84666	23.78	6th LENS
10	∞	▲B			
11	DIAPHRAGM	0.50			
12*	7.657	1.12	1.58913	61.25	7th LENS
13	8.381	▲C			
14*	9.908	2.63	1.58913	61.25	8th LENS
15*	-40.037	0.11			
16	38.816	2.12	1.48749	70.44	9th LENS
17	-18.714	0.18			
18	15.283	1.87	1.58913	61.25	10th LENS
19	-112.371	1.17	1.80518	25.46	11th LENS
20	6.199	▲D			
21	17.732	1.96	1.64769	33.84	12th LENS
22*	-121.961	OPTION			
23	∞	3.214	1.51680	64.20	VARIETY OF FILTERS
24	∞				

▲A: VARIABLE(A)

▲B: VARIABLE(B)

▲C: VARIABLE(C)

▲D: VARIABLE(D)

FIG. 54B

TABLE 5B

<p>NON-SPHERICAL SURFACE OF 6th SURFACE $K=0.0$, $A_4=9.14684 \times 10^{-5}$, $A_6=-9.34472 \times 10^{-7}$, $A_8=1.42322 \times 10^{-8}$ $A_{10}=-1.17627 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE $K=0.09374$, $A_4=2.75961 \times 10^{-5}$, $A_6=1.27476 \times 10^{-6}$, $A_8=1.62751 \times 10^{-8}$ $A_{10}=7.41921 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE $K=-1.26140$, $A_4=2.67355 \times 10^{-4}$, $A_6=-6.25917 \times 10^{-6}$, $A_8=8.12274 \times 10^{-7}$ $A_{10}=-3.08665 \times 10^{-8}$</p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE $K=-1.30919$, $A_4=-1.18876 \times 10^{-5}$, $A_6=2.33312 \times 10^{-6}$, $A_8=-1.34009 \times 10^{-8}$ $A_{10}=-4.54838 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 15th SURFACE $K=-46.11855$, $A_4=7.30394 \times 10^{-5}$, $A_6=3.24821 \times 10^{-6}$, $A_8=-2.36224 \times 10^{-8}$ $A_{10}=-5.40644 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE OF 22th SURFACE $K=45.76087$, $A_4=-5.63924 \times 10^{-5}$, $A_6=-2.40860 \times 10^{-6}$, $A_8=7.82626 \times 10^{-8}$ $A_{10}=-1.12266 \times 10^{-9}$</p>

TABLE 5C VARIABLE INTERVAL

	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$
A	1.239	7.297	13.763
B	14.024	7.966	1.500
C	8.000	3.593	1.500
D	3.950	10.036	11.215

TABLE 5D PARAMETER VALUE OF CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.52$
$(f_{12T}/f_1)=-1.223$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.559$

FIG. 54B

FIG. 55A

TABLE 6A
f=7.52~35.42, F=2.62~4.00, ω =32.99~7.41

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	26.529	1.20	1.84666	23.78	1st LENS
02	15.607	1.17			
03	16.702	4.36	1.77250	49.62	2nd LENS
04	-371.916	▲A			
05*	-29.404	1.00	1.80610	40.73	3rd LENS
06	8.571	2.20			
07	32.023	0.80	1.54072	47.20	4th LENS
08	8.557	2.49	1.84666	23.78	5th LENS
09	30.960	▲B			
10	DIAPHRAGM	0.50			
11*	7.674	1.10	1.58913	61.25	6th LENS
12	8.158	▲C			
13*	10.021	2.54	1.58913	61.25	7th LENS
14*	-63.691	0.10			
15	15.867	2.15	1.48749	70.44	8th LENS
16	-50.882	0.10			
17	12.522	1.82	1.59913	61.25	9th LENS
18	76.837	0.80	1.80518	25.46	10th LENS
19	5.641	▲D			
20	18.992	3.37	1.60342	38.01	11th LENS
21*	-47.165	OPTION			
22	∞	3.214	1.51680	64.20	VARIETY OF FILTERS
23	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

FIG. 55B

TABLE 6B

NON-SPHERICAL SURFACE OF 5th SURFACE $K=0.0$, $A_4=1.37015 \times 10^{-4}$ $A_6=-9.81958 \times 10^{-7}$ $A_8=9.21207 \times 10^{-9}$ $A_{10}=-4.92691 \times 10^{-11}$
NON-SPHERICAL SURFACE OF 11th SURFACE $K=-1.20196$, $A_4=2.83724 \times 10^{-4}$ $A_6=-6.86713 \times 10^{-6}$ $A_8=9.48847 \times 10^{-7}$ $A_{10}=-3.87184 \times 10^{-8}$
NON-SPHERICAL SURFACE OF 13th SURFACE $K=-1.13642$, $A_4=6.34825 \times 10^{-6}$ $A_6=2.90033 \times 10^{-6}$ $A_8=-3.90207 \times 10^{-8}$ $A_{10}=1.09626 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 14th SURFACE $K=-70.94256$, $A_4=6.79619 \times 10^{-5}$ $A_6=3.00428 \times 10^{-6}$ $A_8=-3.35316 \times 10^{-8}$ $A_{10}=-1.72607 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 21th SURFACE $K=14.57109$, $A_4=-5.21909 \times 10^{-5}$ $A_6=-3.69390 \times 10^{-6}$ $A_8=7.04367 \times 10^{-8}$ $A_{10}=-6.33661 \times 10^{-10}$

TABLE 6C
VARIABLE INTERVAL:
TYPICAL PHOTOGRAPHING REGION

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.33	LONG FOCAL POINT END f=35.42	SHORT FOCAL POINT END f=7.44	MIDDLE FOCAL LENGTH f=15.71	MIDDLE FOCAL POINT END f=31.60
A	1.530	8.117	15.363	1.530	8.117	15.363
B	15.770	9.183	1.937	15.770	9.183	1.937
C	8.000	3.409	1.500	8.000	3.409	1.500
D	3.964	9.176	11.332	3.571	7.896	7.438

1098899-112001

FIG. 55C

TABLE 6D
VARIABLE INTERVAL
IN MACRO MODE (A PHOTOGRAPHIC
DISTANCE IS FROM AN IMAGE SURFACE)

	0.3m	0.077m
	f=12.03	f=10.43
A	4.508	4.508
B	12.792	12.792
C	3.816	3.816
D	8.960	4.150

TABLE 6E
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(L1C-L1W)/(L1T-L1W)=0.215$
$(L3C-L3T)/(L3W-L3T)=0.356$
$(D3W-D3T)/(D1T-D1W)=0.47$
$(f12T/f1)=-1.308$

09988793-11001

FIG. 56B

TABLE 7B

NON-SPHERICAL SURFACE OF 6th SURFACE $K=0.0$, $A_4=9.14684 \times 10^{-5}$, $A_6=-9.34472 \times 10^{-7}$, $A_8=1.42322 \times 10^{-8}$ $A_{10}=-1.17627 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 7th SURFACE $K=0.09374$, $A_4=2.75961 \times 10^{-5}$, $A_6=1.27476 \times 10^{-6}$, $A_8=-1.62751 \times 10^{-8}$ $A_{10}=7.41921 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 12th SURFACE $K=-1.26140$, $A_4=2.67355 \times 10^{-4}$, $A_6=-6.25917 \times 10^{-6}$, $A_8=8.12274 \times 10^{-7}$ $A_{10}=-3.08665 \times 10^{-8}$
NON-SPHERICAL SURFACE OF 14th SURFACE $K=-1.30919$, $A_4=-1.18876 \times 10^{-5}$, $A_6=2.33312 \times 10^{-6}$, $A_8=-1.34009 \times 10^{-8}$ $A_{10}=-4.54838 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 15th SURFACE $K=-46.11855$, $A_4=7.30394 \times 10^{-5}$, $A_6=3.24821 \times 10^{-6}$, $A_8=-2.36224 \times 10^{-8}$ $A_{10}=-5.40644 \times 10^{-10}$
NON-SPHERICAL SURFACE OF 22th SURFACE $K=45.76087$, $A_4=-5.63924 \times 10^{-5}$, $A_6=-2.40860 \times 10^{-6}$, $A_8=7.82626 \times 10^{-8}$ $A_{10}=-1.12266 \times 10^{-9}$

TABLE 7C VALUABLE INTERVAL: TYPICAL PHOTOGRAPHING REGION

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$	SHORT FOCAL POINT END $f=7.42$	MIDDLE FOCAL LENGTH $f=15.68$	MIDDLE FOCAL POINT END $f=31.93$
A	1.239	7.297	13.763	1.239	7.297	13.763
B	14.024	7.966	1.500	14.024	7.966	1.500
C	8.000	3.593	1.500	8.000	3.593	1.500
D	5.563	10.036	11.215	5.118	8.673	7.390

FIG. 56C

TABLE 7D
VARIABLE INTERVAL
IN MACRO MODE
(PHOTOGRAPHIC DISTANCE
IS FROM IMAGE SURFACE)

	0.3m	0.077m
	f=12.55	f=10.72
A	4.406	4.406
B	10.857	10.857
C	3.864	3.864
D	10.270	4.960

TABLE 7E
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(L_{1C}-L_{1W})/(L_{1T}-L_{1W})=0.253$
$(L_{3C}-L_{3T})/(L_{3W}-L_{3T})=0.364$
$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.52$
$(f_{12T}/f_1)=-1.223$

FIG. 57A
TABLE 8A

$f=7.52\sim 35.41$, $F=2.76\sim 3.93$, $\omega=33.03\sim 7.33$

SURFACE NUMBER	R	D	Nd	ν_d	REMARKS
01	49.347	1.20	1.84666	23.78	1st LENS
02	21.523	4.03	1.53172	48.84	2nd LENS
03	-735.434	0.10			
04	24.328	2.83	1.77250	49.62	3rd LENS
05	253.175	▲A			
06*	-60.958	1.00	1.84666	40.73	4th LENS
07	8.431	2.83			
08	-14.822	0.80	1.51680	64.20	5th LENS
09	12.501	1.89	1.84666	23.78	6th LENS
10	∞	▲B			
11	DIAPHRAGM	0.50			
12*	12.181	1.16	1.58913	61.25	7th LENS
13	19.058	▲C			
14*	10.066	2.66	1.51680	64.20	8th LENS
15	-37.782	0.23			
16*	26.397	2.21	1.48749	70.44	9th LENS
17	-19.437	0.10			
18	15.810	1.87	1.62374	47.05	10th LENS
19	-94.257	0.81	1.80518	25.46	11th LENS
20	6.298	▲D			
21	16.724	3.19	1.62004	36.30	12th LENS
22*	-226.088	OPTION			
23	∞	3.214	1.51680	64.20	VARIETY OF FILTERS
24	∞				

▲A: VARIABLE(A)
 ▲B: VARIABLE(B)
 ▲C: VARIABLE(C)
 ▲D: VARIABLE(D)

FIG. 57B

TABLE 8B

<p>NON-SPHERICAL SURFACE IN 6th SURFACE $K=0.0$, $A_4=7.30131 \times 10^{-5}$ $A_6=-7.18253 \times 10^{-7}$ $A_8=7.92813 \times 10^{-9}$ $A_{10}=-4.79927 \times 10^{-11}$</p>
<p>NON-SPHERICAL SURFACE IN 12th SURFACE $K=-2.47920$, $A_4=1.19559 \times 10^{-4}$ $A_6=-7.86193 \times 10^{-6}$ $A_8=8.04663 \times 10^{-7}$ $A_{10}=-3.15795 \times 10^{-8}$</p>
<p>NON-SPHERICAL SURFACE IN 14th SURFACE $K=-1.36970$ $A_4=-2.75811 \times 10^{-5}$ $A_6=-9.84986 \times 10^{-7}$ $A_8=-5.50234 \times 10^{-8}$ $A_{10}=-1.76532 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE IN 16th SURFACE $K=-16.43413$, $A_4=-5.94270 \times 10^{-5}$ $A_6=3.37933 \times 10^{-7}$ $A_8=8.00684 \times 10^{-8}$ $A_{10}=3.43034 \times 10^{-10}$</p>
<p>NON-SPHERICAL SURFACE IN 22th SURFACE $K=0.0$, $A_4=-4.02551 \times 10^{-5}$ $A_6=-2.96070 \times 10^{-6}$ $A_8=9.12260 \times 10^{-8}$ $A_{10}=-1.34602 \times 10^{-9}$</p>

TABLE 8C

VARIABLE INTERVAL: TYPICAL PHOTOGRAPHING REGION

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.33	LONG FOCAL POINT END f=35.41	SHORT FOCAL LENGTH f=7.43	MIDDLE FOCAL POINT END f=15.76	MIDDLE FOCAL POINT END f=32.02
A	1.362	7.523	13.223	1.362	7.523	13.223
B	13.361	7.201	1.500	13.361	7.201	1.500
C	8.000	3.864	1.500	8.000	3.864	1.500
D	5.373	9.240	11.288	4.937	7.944	7.412

FOOT" 65488660

FIG. 57C

TABLE 8D
VARIABLE INTERVAL IN MACRO MODE
(PHOTOGRAPHIC DISTANCE IS
FROM IMAGE SURFACE)

	0.3m	0.077m
	$f=12.79$	$f=11.19$
A	5.415	5.415
B	9.308	9.308
C	4.309	4.309
D	8.630	3.620

TABLE 8E
PARAMETER VALUE OF
CONDITIONAL EXPRESSION

$(L1C-L1W)/(L1T-L1W)=0.342$
$(L3C-L3T)/(L3W-L3T)=0.432$
$(D3W-D3T)/(D1T-D1W)=0.55$
$(f12T/f1)=-1.211$